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ORIGINAL ARTICLES.

THE PRACTICAL VALUE OF THE RÖNTGEN-RAY IN THE ROUTINE WORK OF SURGICAL OFFICE PRACTICE.

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THE object of the present communication is to illustrate the usefulness of the Röntgen-ray in the daily office work of the busy practitioner. The results which I have obtained in X-ray photography, as shown by the accompanying illustrations, are not, of course, to be compared with those from elaborately and expensively equipped laboratories and hospitals, for they were all taken in connection with my routine office practice. They have been selected from a large number to show the value of skiagraphy in the every-day work of one who knows nothing about photography, nothing about electricity, and but little about physics; who, in short, knows just enough of the principles involved to enable him to place the patient, the tube, and the plate in a proper position, and to turn on the current.

A further object of this paper is to show, if possible, that no surgical consulting-room is fully equipped without an apparatus for X-ray investigation. Doubtless the application of this device to medical diagnosis is quite as important as to surgical, but this question I leave to others more competent to judge.

In the course of the past three months I have been able not only to make accurate diagnoses in many cases, in which accuracy was impossible without the X-ray, but also to avoid serious mistakes in the investigation of fractures and dislocations. I have been able to watch the growth of an osteosarcoma until, from having invaded half the radius, it had destroyed the whole; to ascertain the situation and extent of patellar and other fractures when such knowledge was of great value, and could have been acquired in no other way. In other instances I have been surprised to see the excessive malposition of fragments which, by former methods of examination, seemed to be in unusually good approximation. It has been possible also to detect foreign bodies in the trunk and in the extremities, with a certainty which seemed extraordinary. Results thus obtained in every-day work by one so ignorant of the subject, lead to the belief already expressed, that the X-ray apparatus is indispensable to the consulting-room; that it is as essential to the surgeon as the mirror to the laryngologist, or the stethoscope to the general practitioner.

The cumbersome and expensive apparatus of the laboratory, of the hospital, or of the expert, seems unnecessary in connection with every-day skiagraphy—as unnecessary as a knowledge of cathodes and annodes, of poles and coils. The technic of skiagraphy, like that of the telephone and phonograph, should be of the simplest kind, and should require only the most elementary knowledge. Not that a knowledge of, and taste for, electricity and physics is useless, but for the general application of skiagraphy such knowledge and aptitude is not necessary.

The essentials, therefore, of an X-ray apparatus for general office work, both in fluoroscopy and in photography, are (1) simplicity, and (2) ease and rapidity of application. It is extremely desirable that the apparatus, of whatever form, should be connected with the street electrical mains. Storage-batteries are less convenient, though they may be used when connection with the street-currents is impracticable. That form of Crookes' tube is of the greatest value which is not easily disarranged or broken, and which can be easily adjusted in different positions. The sole efforts of the surgeon should be directed to the adjustment of the patient and the tube, and to the use of the fluoroscope, and of the photographic plate. Impairment or complete arrest of even the simplest and best machinery must of necessity take place, from the very nature of the process—accidents which cannot be prevented even by those who are most familiar with electrical machinery. It is essential, therefore, that the apparatus should be supplied by responsible firms who are prepared, when summoned, to respond at once by sending expert repairers. In this respect the X-ray apparatus should be on the same footing as the telephone, the phonograph, and the typewriter. Upon this point considerable stress should be laid, for the breaking down of an apparatus in the middle of an office hour, when, perhaps, appointments have been made for its use, may subject both surgeon and patient to inconvenience and annoyance.

The method should be capable of rapid application. Many machines require so much time for their adjustment that they cannot be recommended, even if their results are superior to those of a method more

speedily applied. The one with which the accompanying illustrations were taken required no preparation whatsoever. The current (a direct one derived from an Edison light fixture in the wall of the room) passes through various machines to the Crookes' tube. The most important part of the apparatus is, I believe, a Tesla coil immersed in oil. The tube is so mounted that it may be placed in any position. By turning one lever, a portion of the machinery begins to move; by turning a second, the tube is excited and the ray is produced. The whole in its application is simplicity itself. Should the apparatus fail to work, the company at once sends a man to put it in order.[1] In many cases, particularly in examinations of the hand or the foot, a minute or even less is sufficient to give all the necessary information; in others, especially in examination of the thick parts—the shoulder, the knee, the trunk, for example—a longer time is necessary. In ordinary cases of fracture, dislocation, or presence of a foreign body, the use of the fluoroscope requires not over five or ten minutes—a period of time which would be a short one for making a careful diagnosis in obscure cases under former methods of observation. I have used the Carbutt plate of various sizes. After an exposure of from thirty seconds to fifteen minutes, the plates are labeled, put one side, and sent when convenient to the developer.

The value of the X-ray in office work is conspicuous in the detection of fractures and dislocations of the bones; in the demonstration of integrity whenever suspected fractures and dislocations do not exist; in the detection and localization of foreign bodies; in the diagnosis of growths composed wholly or in part of bone. It has, of course, other and less important uses. Unless the surgeon has the apparatus at his elbow, this information can be obtained only by sending the patient to a hospital or to an expert; even then, the surgeon must depend upon an oral or a written opinion, or upon a photograph, unless he goes himself with the patient—reasons which themselves justify the assertion that every surgeon should do his own skiagraphy. In recent fractures—chiefly of the upper extremities, the clavicle, and the ribs—the exact position of the fragments, before and after reduction, can be made out. With the aid of an assistant a faulty adjustment may be rectified at once. Displacement of the fragments may be discovered long before the time for reapplication of the splints. In those fractures of the lower extremities which present themselves at the office, the same information may be obtained. Indeed, an early fluoroscopic examination of every fracture may soon be required of every surgeon for the protection of the patient, and an early photograph for the protection of the surgeon.

In old fractures the information to be gained by the method under consideration is often invaluable, for only in this way can we determine the position of fragments, the point of impingement, and the cause of impaired functions. Here, as in most X-ray work, the fluoroscope gives vastly more important information than the photograph, because one sees in succession the parts from every point of view.

FIG. I.

CASE II.—Fracture of both bones of the forearm. Condition ninety-six days after the accident.

Dislocation of the extremities, old and new, can never be overlooked in fluoroscopy. The slightest variation from the normal is immediately visible in an extremity, below the shoulder or the hip. Even in the shoulder an obscure dislocation can generally be detected, unless the parts overlying the bone are unusually thick. The occasional failure to detect a dislocation of the elbow—a mistake with which the

[1] For four weeks this has been unnecessary. I have used the same tube as often as occasion has required, and nothing whatever has been done to the machinery or to the tube.

most experienced are sometimes confounded—is impossible if the surgeon, as a matter of routine, examines with the fluoroscope. I have overlooked a backward dislocation of both bones of the forearm during twenty weeks' constant observation—an error in which my colleague shared. This fact alone justifies the proposition upon which this communication is based—that the new method of observation is one of the essentials of every-day examination. In another instance, that of a man of sixty, the physician in attendance was sure that there was an unreduced dislocation of the humerus. In spite of careful and repeated examinations by the usual methods, I was

FIG. 2.

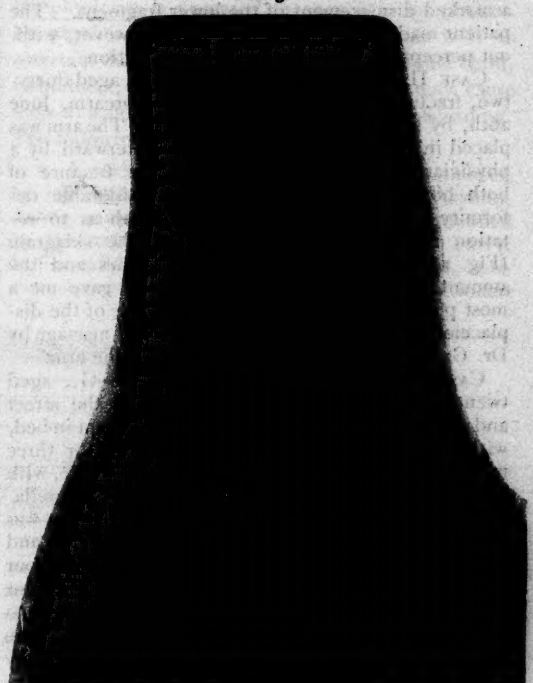
CASE VI.—Osteosarcoma of the radius demonstrated by the skiagram. Previous diagnosis was aneurism of the radial artery.

not absolutely convinced that the head of the bone was in its proper place until I examined the shoulder carefully with the fluoroscope from several points of view.

In ununited fractures, especially of the humerus and of the forearm, the situation of the bone can be detected with great ease. In one instance the physician blamed himself, and the patient the physician, for a non-union of the humerus, when a careful examination with the fluoroscope showed that the bones were in perfect apposition. What prevented the union of the humerus it was impossible, of course, to say; it was nevertheless a great satisfaction to know that the non-union did not depend upon any faulty position of the fragments.

In the detection of foreign bodies the apparatus is, of course, indispensable. Two or more points of view are essential to determine by triangulation the exact position of the body.[1] The demands from this source are, however, infrequent. As in other X-ray examinations, the fluoroscope possesses far greater value than the skiagram. Other not infrequent uses for the X-ray in general surgical practice are the demonstrations of bone diseases—exostoses, tumors, loss of substance, irregularities in contour, and variations

FIG. 3.



CASE VIII.—Compound fracture of the tibia and fibula. Skiagram taken three months after the accident.

in size. In some instances, notably of osteosarcoma, it is possible to detect the growth in its early stages, as soon as the density and contour of the bone is affected. Such a growth may be watched from week to week; the bone may be seen gradually to melt away before the invading neoplasm. In tumors of undoubted bony origin deductions based upon density may easily be made. Exostoses, especially of the extremities, often present pictures of the greatest detail and accuracy (Fig. 3). Irregularities in outline from erosions, necroses, bony deposits, in fact all forms of bone-disease attended by change in form, widen still

[1] Trowbridge, *American Journal of Science*, vol. I, 1896.

further the scope of skiagraphy. It must be borne in mind that all the investigations detailed in the foregoing paragraphs may be made in the course of the ordinary surgical examination.

The following cases have been selected from a large number to illustrate the foregoing remarks:

CASE I.—July 14, 1896: Mrs. A., aged thirty-two, sustained a fracture, July 1st, of both bones of the forearm. The fracture had been reduced immediately by a surgeon of great experience. By ordinary methods of examination, the arm seemed in perfect condition; in fact, a more perfect approximation of fragments could hardly be imagined. A skiagram showed the radius in good position, the ulna with a marked displacement of the lower fragment. The patient made an excellent recovery, however, without perceptible deformity or loss of function.

CASE II.—October 5, 1896: Mrs. B., aged thirty-two, fractured both bones of the left forearm, June 26th, by being thrown from a bicycle. The arm was placed in a metal splint half an hour afterward by a physician. On October 5th, I found a fracture of both bones of the forearm, with considerable deformity and serious loss of function, both as to rotation and flexion of the hand. The skiagram (Fig. 1) shows the position of the bones and the amount of deformity. The fluoroscope gave me a most perfect idea of the extent and nature of the displacement. In spite of the displacement, massage by Dr. Graham has considerably improved the arm.

CASE III.—October 10, 1896: Miss G., aged twenty-seven, fell, January 10, 1896, in the street and fractured the right patella. She was kept in bed, with the usual treatment of such injuries, for three months. A second fall resulted in a refracture, with excessive separation of the fragments of the patella. The fluoroscope showed that the lower fragment was directly over the articulation between the tibia and the femur; that the upper fragment was some four inches higher; that there was a third small fragment loosely attached to the lower one, and slightly separated from it. This fragment was shown to be also partly divided; it could not be detected by digital examination. The seat of injury was exposed on October 13, 1896, and, after much difficulty, by cutting the tendon of the quadriceps above and below the patella, the parts were brought into position. The small fragment interfered so much with approximation that it was entirely removed. The patient has made a good recovery.

CASE IV.—October 13, 1896: Mr. C., aged sixty-two, had been troubled for six years with a painful thickening of the terminal phalanges of the great toe of the right foot. Digital examination seemed to indicate a thickening of the bony parts of this toe. A skiagram showed most beautifully all the bones of the foot, but nothing could be seen indicating disease of the bone. The demonstration was very satisfactory, and solved the question of operative interference.

CASE V.—October 16, 1896: G. B., a boy of twelve, had been injured in the left hand, two weeks before, by a bullet from an air-gun. It was not supposed possible by the attending physician that the bullet had penetrated the palm. The fluoroscope showed plainly a small metallic object over the distal extremity of the middle metacarpal bone. A side view showed the depth of this bullet in the palm. Under cocain the bullet was removed.

CASE VI.—October 17, 1896: General W., aged fifty-nine. This gentleman had had for five months a painful swelling in the right wrist. By means of the fluoroscope the ulna was seen to be intact, the radius to terminate abruptly in the faint shadow of the carpal tumor (Fig. 2). A thin shell of the radius could be seen remaining. The diagnosis of osteosarcoma of the radius, made from the history of the case and from inspection and digital examination, was practically proved by the fluoroscope and by the skiagram. A previous consultant had assured this patient that the tumor was an aneurism of the radial artery. In a second skiagram, taken a month later, the shell of bone had entirely disappeared, a fact that demonstrated the bony origin of the tumor and the rapidity of its extension. The arm was amputated, and the disease proved to be an osteosarcoma of the radius.—In a precisely similar case, Mr. F., aged seventy-three, a tumor of the left wrist was diagnosticated beyond a doubt by the Röntgen-ray. In this case, skiagraphed by an expert, the bony structure of the tumor could easily be seen. The arm was amputated after the incision of the tumor and the microscopic demonstration of its nature.

CASE VII.—October 17, 1896: Mr. P., aged twenty-seven, presented himself with a fracture of the patella of three months' standing. The fluoroscope and a skiagram showed a ligamentous union of a fracture in the lower and middle thirds of the patella. It was proposed to allow the man to go about his business. The fragile union, clearly demonstrated by the X-ray, alone justifies the opinion that he ought not to use the limb freely till the expiration of six months.

CASE VIII.—October 19, 1896: Mr. J. M., aged sixty, had received from a fall a compound fracture of the left leg. The bones of the tibia and fibula had been extensively comminuted, with laceration of the skin. He was under my care at the Massachusetts General Hospital, where he remained some three months. On his discharge from the hospital the leg was perfectly straight; there was no impairment of the function of the ankle, and the union was unusually firm; yet a rather poor photograph clearly shows the extraordinary position into which the bones had been adjusted (Fig. 3).

CASE IX.—L. S., a girl of thirteen, had suffered for nine months with a large painful tumor of the left thigh. After amputation at the hip joint an X-ray photograph was taken of the tumor. The relation of the tumor to the femur, and the involvement of the bone were more clearly shown than was possible in any other way. The growth was an endothelioma (Wright). The patient made a good recovery.

(To be continued.)

BEST METHODS OF EXAMINING SICK CHILDREN, WITH A CONSIDERATION OF SOME OBSCURE OR RARE MALADIES.

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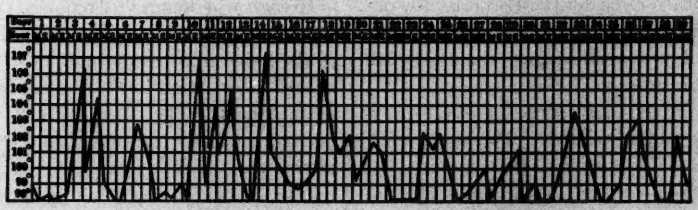
THE examination of children in sickness is surrounded with difficulties which do not occur when the patient is of a more advanced age. The young child cannot describe its suffering, or tell us the seat of its disease; many of its ailments are peculiar, are more concealed, and require more time for investigation and exact diagnosis than the maladies of later life. Therefore, the physician who wishes to excel as a pediatrist must not expect to make a brief visit when summoned to a case, but must remain long enough to learn all the essential details of the malady. Upon visiting a sick child he should enter the nursery quietly, preceded by the mother or nurse, and taking a seat at a distance from the patient, and without appearing to notice him, should learn its history and the particulars of its sickness. With the information thus obtained, and a careful observation of the symptoms, so far as they can be observed at a distance, the experienced physician can often make a diagnosis, which a closer examination shows to be correct. In some instances this distant examination gives a more accurate idea of the nature of the malady than is to be obtained by a closer inspection. The pain of an otitis media is indicated by the infant carrying its finger to the ear, but it does not do this if frightened by the near presence of a stranger.

Attempts to amuse a sick child are always proper, and the physician should endeavor to accommodate himself to the degree of mental development of his patient. The child should feel that he has a friend and playmate in the doctor, and he will then act in a more natural manner, and with less concealment. In my practice, the percussion-hammer, and the prescription-paper and pencil, used for amusing the patient, often divert his attention from his sickness, and by this occupation of his mind his symptoms usually become more manifest. One of the most distinguished pediatrists in America has a soft, melodious chime connected with his watch, and this attracts and delights the little patient, if he be not in too much pain, and he submits more readily to an examination. Force should never be used except in the case of the restraint necessary for the inspection of the fauces. A physician who endeavors to overcome the dread and resistance of a sick child by threats and scolding will never be successful in treating children. After the history has been ascertained (which should include the age, mode of feeding, previous diseases, and in some cases, the health of the parents, together with the symptoms, manner of commencement, and duration of the present sickness), the physician is prepared to approach the patient. No physician need be told how important it is to ascertain the temperature, but in an emotional child, excitement, as that produced by fright, may cause such a sudden increase as may prove misleading. The following case is an example of this:

A female child in its second year, wetnursed by its mother in the New York Infant Asylum, during my visits in 1894, and carefully attended by the resident physicians, Drs. A. and E. Parry, had a mild intestinal catarrh, which did not, however, appreciably affect the temperature. The infant



was extremely emotional. The sudden entrance of a stranger, or his attempts to hold it, or the slamming of a door, caused the high and transient elevations shown in the accompanying chart.

A physician examining a case of this kind would probably make an error in diagnosis, if he did not remain long enough to witness the decline in the fever. Instances of such great variations in temperature from the emotions are not common, but that they do occur should be borne in mind. A young musician of this city immediately before he appeared upon the stage always had a temperature of 102° F.; at other times it was normal. A resident physician of the Charity, now City, Hospital, at one time had a dangerous attack of typhoid fever, by which he was much reduced. The fever finally disappeared, and he began to convalesce, when some friends presented him with a gold watch. The gift took him by surprise and his emotion was so great that it caused his temperature to rise to 103° F.

To prevent any possible aberration from fright or excitement, it is better that the temperature of a child

be ascertained by the mother or nurse before the approach of the physician.

During my long service as one of the physicians to the N. Y. Foundling Asylum I have attended many infants for whom breast-milk could not be obtained. Most of these children had been left at the Asylum doors, and were under the age of two months, and many under one month. There being a large maternity service in this institution, the breast-milk was obtained in as many instances as possible, and those infants receiving it, as might be expected, did better than the bottle-fed babies. The death-rate of the latter was always large, and the most certain sign of the near approach of death was the occurrence of a subnormal temperature. The fall of temperature, at first slight, gradually increased, and when it had descended to 96° F. death uniformly occurred in two or three days, notwithstanding active stimulation. In weak and wasted infants suffering from malnutrition, therefore, a persistent subnormal temperature must be regarded as a very unfavorable prognostic sign.

No one need be told of the importance of observing the presence of abnormalities in the state of the eyes. Dilatation, inequality and sluggish movements of the pupils, oscillation, and strabismus, occurring during the course of an illness, are unfavorable diagnostic and prognostic signs, since they are indicative of cerebral disease.

Rachitis I find, in its early stages, is often overlooked or wrongly diagnosticated. The late Professor Henoch of Berlin has said that rachitis has increased enormously of late in the cities of central and northern Europe; I have found it common in its worst form in Italian immigrants and American negroes, and this is probably due to the poor diet and the unsanitary condition in which they live. I attribute the large increase of rachitis in this country partly to the pauper immigration, and partly to the extensive use of proprietary foods, without any, or with too little, milk. I have examined the composition of thirteen of the commercial foods, and I find that nine of the thirteen contain less than one per cent. of cream. It is sufficient for the present purpose to draw attention to the increasing frequency of rachitis in America, either as a complicating or primary disease, believing that if the fact of its frequency were generally known, the error of a mistaken diagnosis, in its early stages, would be less common.

In diseases attended by emaciation the brain wastes in the same manner as other parts of the system, and if the sutures and fontanels are not closed, and the cranial bones are thus movable, the frontal and occipital bones are depressed and overridden by the parietal. This fact has led to serious mistakes in diagnosis. With the exception of those abnormalities in the shape and development of the cranium, which result from, and pertain to, rachitis, all will agree that in following the advice given by Rilliet and Barthez to "study cerebral symptoms with care," the anterior fontanel will require more attention than any other part of the cranial arch. We all know the significance of a tense and elevated fontanel, occurring without premonition, but attended by fever, and not abating when cool applications are made to the head. In infants in previous ill health, who are much emaciated, the brain, as has been said, participates in the general waste, and if tubercular meningitis, which is not uncommon, occur, with considerable increase of the cerebrospinal fluid, this increase, as I have observed, does not equal the waste, and the fontanel remains depressed. This fact should be borne in mind to prevent error in diagnosis.

Cases are by no means rare in which faucial inflammations of a grave nature are overlooked in their beginning. Mothers, and sometimes physicians, have informed me that the symptoms of the case under examination did not indicate any involvement of the fauces, when inspection revealed the presence of disease which urgently required treatment. A nasal discharge (though slight), huskiness, or other change in the voice from the normal, or an occasional cough, should direct attention to the fauces and lead to their examination. The physician will never regret that he has made this inspection, and often the whole line of treatment will be changed. Without such examination, I have known malignant diphtheria to be mistaken for mumps, and mild diphtheria, with but little tenderness and swelling, to escape notice entirely. Inflammation of the air-passages in infancy and childhood is in many instances trivial, and soon begins to abate, but in a severe form is dangerous, and even fatal; and, from its frequency, it requires a careful examination before diagnostic and prognostic opinions are expressed. Infantile bronchitis, in its commencement, though confined to the larger tubes, if attended by restlessness and fever, should not be made light of. The inflammation is probably pursuing a downward course. Bronchopneumonia is especially a disease of infancy. Unlike the adult pneumonia, it is seldom accompanied by the brick-dust sputum, and bronchitis being a prominent element, a cough is frequent from beginning to end. In this respect it is unlike pleurisy, which, even in the purulent form, sometimes never gives rise to cough during the entire course of the disease. There are other diseases of the pulmonary and circulatory systems in children which are interesting, and which should be carefully considered before a diagnosis is made, but we must pass them by.

One disease I have not infrequently observed in ill-fed and anemic children, as well as in adults. There is tenderness and dull pain, increased by pressure, over a certain area, whether upon the forehead, face, chest, abdomen, or elsewhere. Pressure along the spine and over the rootlets of the nerves which supply the affected part is not only painful at the point of pressure, but it intensifies the habitual pain from which the patient suffers. It has been variously designated as spinal affection, spinal irritation, hyperesthesia, etc. The late Professor Austin Flint was among the first to direct attention to this disease. In 1844 he published a statistical paper descriptive of what he called "the spinal affection," and in his classical treatise on the "Principles and Practice of Medicine," 1886, he designated it "spinal irritation." To my knowledge, this malady is often mistaken for chronic indigestion, gastro-intestinal catarrh, or subacute pleurisy, and if the patient be treated according to one of these diagnoses, he is certain to be made worse. The symptoms of "spinal irritation" and vertebral caries are, in some cases, very similar, but it is not difficult to distinguish one from the other if the mode of examination given in orthopedic treatises is carried out. Dr. Flint once told me that when in Paris he attended the clinic of a distinguished physician, whose name is favorably known in both hemispheres, and a case of abdominal tenderness was presented. After an examination, the professor diagnosticated the condition as peritonitis, and courteously allowed him to examine the patient. Pressure upon the spine elicited pain, which was felt not only along the spine, but over the abdomen. Flint recognized the disease which he had studied so carefully, and expressed the opinion that it was of nervous origin, resulting from anemia, and was not inflammatory—an opinion in which the distinguished clinical teacher concurred after further examination. When we consider that this mistake in diagnosis was made by a physician of great renown, and if not rectified would have led to improper treatment, how important it is that the statistical monograph written by Austin Flint fifty-two years ago should be carefully perused, and the facts which he forcibly presents be impressed upon the memory!

Another disease, the early diagnosis of which is not difficult, is intestinal intussusception. In a considerable proportion of these cases the displacement is not diagnosticated until the chances of recovery are slight. In many patients the invagination takes place by the prolapse of the lower part of the ileum through the ileocecal orifice. This causes swelling and hardness, which may be mistaken for appendicitis. The diagnosis of intussusception is, I think, not difficult, for in whatever part of the intestinal tract it is located, the occlusion is usually so complete that, after the rectum is once washed out, only blood, or blood with mucus, escapes from the invaginated gut. This character of the discharge differentiates the condition from appendicitis, which is not attended by bloody evacuations.

I have heard it stated by some of the oldest physicians of New York that during their entire professional life they have from time to time been summoned to attend children, even as young as two or three years, who have had a fever, which, through want of accurate knowledge of its nature, they have designated malarial. The younger physicians, following their seniors, have adopted the same nomenclature, and, though a false designation, it is likely to be perpetuated. This fever, as I have observed it year after year, occurs during any season, but appears to be most frequent in the autumnal months. Ordinarily it comes on gradually, with malaise, chilliness, anorexia, headache, moderate thirst, weakness, and a dull expression of face. The fever is constant, varying in degree at different times in the twenty-four hours, being usually highest in the evening and at night. A slight cough may also be present. In uncomplicated cases, the most thorough examination fails to reveal a local cause adequate to produce the fever. The duration of this malady varies; it may not be longer than nine days, or it may last for some weeks. Quinin has no appreciable effect, unless that it diminishes in slight degree the febrile exacerbations. There is commonly no marked abdominal tenderness or decided tenderness or enlargement of the liver or spleen, and in most cases no rose-colored eruption. A physician of this city has informed me that some twenty-five years ago he attended a case of this fever, which was unusually protracted. The late Professor Alonzo Clark, who was also in attendance, stated that for many years he had taught in his lectures that this mild fever in children was a form of typhoid, but he had never had the opportunity to verify his diagnosis by an autopsy, as he had never observed a fatal case; but a former pupil of his, practising in a New England city, had recently lost a child from this fever, and being permitted to make an autopsy, had found distinct typhoid lesions. Since Professor Clark's death his opinion of the nature of this fever has been abundantly verified by clinical observations and autopsies. Moreover, in some of the instances, the children, mildly sick in the manner which I have described above, evidently communicated the fever in its usual form to the nurses. Thus, in my practice, two children had the fever in its usual mild form, refusing to remain in bed, and sitting in a listless manner most of the time close to the fire. In about two weeks, when they began to

convalesce, the nurse sickened with the same disease, which continued in a very severe form for thirty-five days.

The term malarial fever, so commonly applied to the mild typhoid or enteric fever of infancy and childhood, is, therefore, a misnomer, and in the present advanced state of pediatric knowledge should be abandoned.

UNILATERAL ALBUMINURIC RETINITIS, WITH CASES.[1]

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USUALLY both eyes are affected in albuminuric retinitis, although it is common to find more extensive lesions in one eye than in the other, just as one kidney is often more diseased than its fellow. In many cases, in the early period of the disease, the visual defect is asymmetrical, one eye exhibiting retinitis or neuroretinitis, while the other is still free from inflammatory or degenerative changes. Subsequently, however, in the great majority of cases, both retinas become affected.

In regard to the frequency with which unilateral cases occur, opinions differ. Thus, Gowers[2] says: "Both eyes are almost invariably affected," while Knies[3] declares "Unilateral cases are not a rarity;" and, again,[4] "Unilateral retinitis albuminurica is not extremely uncommon."

In confirmation of Knies' declaration, a number of cases of monolateral neuroretinal lesions attributed to so-called chronic Bright's disease may be found scattered through medical literature. Thus, Despagnet,[5] in his statistical report of the retinal diseases seen in the Galezowski clinic, records a case of unilateral retinitis albuminurica; the right eye was affected, the left being entirely normal. Yvert[6] observed in a forty-eight-year-old patient unilateral, left-sided retinitis albuminurica, with characteristic changes in the macula. At the autopsy, only the right kidney, in a state of parenchymatous inflammation, was present. Brunet[7] describes a case of right-sided anasarca with right-sided retinitis albuminurica. W. Cheatham[8] records "a perfect picture of neuroretinitis albuminurica" of the left eye in a girl aged fourteen, whose urine contained cysts and albumin. The right eye was healthy. Henry Eales[1] reports a case of supposed unilateral albuminuric retinitis, the visual disturbance appearing one day after an injury to the left loin. Three weeks later, the right eye being normal, there were in the left eye neuritis, and exudates in the macula. The final outcome of the case was an atrophic disk, with glistening patches in the macula and degeneration of the choroid. Albumin, which was present, gradually disappeared; casts were not found. Bull, in his analysis of 103 cases,[2] remarks: "Both eyes were affected at the time of the examination in fifty-four (54) cases, and both eyes became affected while the patients were under observation in ninety-three (93) cases." The natural inference from this quotation is that there were ten (10) unilateral cases. Almost ten per cent. of one-sided retinitis albuminurica is a clinical observation somewhat at variance with the accepted ideas on this subject, and therefore I wrote to Dr. Charles S. Bull with reference to this point, and received the following reply:

> You are quite correct in inferring that in the paper written by me in 1886, and referred to by you, there were ten cases of unilateral neuroretinitis, which remained so until the end of the patient's life. None of these cases came to autopsy by me, though in two an examination was made *post mortem* by another physician. It is, perhaps, pertinent to state that in these ten cases the renal disease was severe in its onset, and rather rapid in its progress, and in none of them lasted longer than five months. I have under observation now a case of nephritic neuroretinitis, confined to one eye, which has lasted eight months, and the other eye is, *as yet*, intact.

These cases will suffice as examples of unilateral neuroretinitis of nephritic origin scattered through literature, and also suffice to show that it is not an uncommon phenomenon. I have no doubt there are many more, as I have not attempted an exhaustive search.

My personal experience comprises the examination of two cases. One of these I have briefly recorded elsewhere.[3] This patient was a colored man, who came from the medical clinic of the Hospital of the University of Pennsylvania to the Eye Dispensary, with the report that he was suffering from Bright's disease, and requesting an ophthalmoscopic examination. The fundus oculi of one eye was practically normal, while the other showed an extensive neuroretinitis. The patient was not again seen, so far as I am aware, and I have no knowledge of his future history or of the future conduct of the case.

The case which I particularly wish to report to-night has been under observation for some time, and is as follows:

Stephen Punnell, a negro laborer, aged fifty-one years, came to my dispensary in the Philadelphia

[1] Read in the Section of Ophthalmology in the College of Physicians of Philadelphia, November 17, 1896.
[2] "Medical Ophthalmoscopy," third edition, 1890.
[3] "Die Beziehungen des Sehorgans und seine Erkrankungen zu den übrigen Krankheiten des Körpers und seiner Organe," Wiesbaden, 1893, page 311.
[4] *Loc cit.*, page 314.
[5] *Recueil d'Ophthalmologie*, 3 Série, 4, 1882, p. 93.
[6] *Ibid.*, 3 Série, 5, 1883, p. 145.
[7] *Journ. des Scienc. méd. de Lille*, No. 9, 1884, p. 313.
[8] *Journ. Amer. Med. Assoc.*, vol. v, 2, 1885, p. 150.

[1] Trans. of the Ophth. Soc. of the U. K., vol. v, 1885, p. 126.
[2] Trans. Amer. Ophth. Soc., 1886, p. 185.
[3] De Schweinitz, "Diseases of the Eye," second edition, p. 433.

Polyclinic on the 13th of June, 1896, complaining of loss of vision in his right eye. He also stated that he had pain in the lumbar region, and had noted increased frequency of micturition.

For the history of this patient, and for the physical examination, I am indebted to my assistants, Dr. Frances Janney and Dr. Mary Getty, as follows:

The patient's mother died at the age of fifty-five, and before death "had swelling in both feet." His father died, aged sixty-nine, from paralysis. The patient's habits are good. He has never used liquor, and there is no history of syphilis. His previous illnesses were measles, whooping-cough, typhoid fever (in 1869), and bilious intermittent fever, two years ago. He dates his present illness to three years ago; but declares he has suffered from lumbar pain since the Civil War. Physical examination reveals a normal heart and normal cardiac action.

Ocular examination: Vision of the right eye $\frac{6}{10}$, unimproved by glasses; of the left eye, after the correction of a low grade of hypermetropic astigmatism, $\frac{6}{6}$. There were no abnormalities of the pupil-reflexes or of the external ocular muscles.

The pupil of the right eye having been dilated with cocain, the following lesions were discovered: A disk with congested surface, but clear edges; extensive flame-shaped and irregular hemorrhages occupying the temporal region as far as the macula, and somewhat beyond it, and the upper retina nearly to the periphery of the eye-ground; a few scattered hemorrhages on the nasal side, the entire lower half of the eye-ground being free from gross pathologic changes. In addition to the hemorrhages, there were numerous roundish and elongated yellowish-white patches, some in close proximity to the hemorrhages, and evidently representing areas of fatty change, as well as patches of degeneration, the sequel of previous hemorrhagic extravasations. The arteries are about normal in size, the veins somewhat distended, and slightly tortuous.

It will be noted at once that the lesions are not typical in the sense of a star-shaped figure in the macula and a "snow-bank appearance" around the disk, but represent those which we are accustomed to associate with thrombotic conditions in the retinal venous circulation. Closer examination of the distribution of the veins makes it evident that the upper and lower temporal vein are fairly normal in constitution, although in places somewhat covered above by exudation. The lower nasal vein is also well marked, while the upper nasal vein, from its point of entrance into the optic disk to about one-half the disk diameter, upward and inward, appears to be obliterated, or is present only as a very fine thread. Beyond this point the vein can be readily traced. This appearance adds still more to the supposition that the primary lesion in this case was a thrombosis of a venous branch, rather than a true retinitis or neuritis. We have, in other words, a condition of apoplexy of the retina, rather than a neuroretinitis.

In the left eye the surface of the disk was about normal in appearance; there was some fine white haze in the immediate neighborhood of the disk, but no hemorrhages, no splotches, and no areas of degeneration. The refractive error was a hypermetropic astigmatism (+.50s.⊖+.50c. axis 180), and with this glass, vision, as before stated, was $\frac{6}{6}$.

The patient was referred to the medical dispensary for general treatment, and Dr. Riesman has kindly furnished me with the results of the urinary examination. An average examination is the following: *Microscopic:* An unusual number of oxalate-of-lime crystals, many uric-acid crystals, and numerous broad granular casts. *Chemic:* A large amount of albumin, no sugar; blood, by the guaiac test. Specific gravity varying from 1011 to 1031.

From that date to the present time the patient has remained under my observation, and under suitable treatment from my medical *confrères.* Abundant clinical examinations indicate a typical case of interstitial nephritis.

The following changes have occurred in his fundus oculi: Decrease in the areas of hemorrhagic extravasation, with development of larger areas of degeneration, and well-marked lines of perivasculitis. The vision at the present time remains as before, $\frac{6}{10}$ in the affected eye and $\frac{6}{6}$ in the left, or unaffected eye, which continues to be normal in appearance.

In regard to the etiology of unilateral neuroretinitis, or so-called hemorrhagic retinitis, in Bright's disease, various theories may be utilized. Yvert explained his case of one-sided retinitis albuminurica by assuming an irritation of the sympathetic nerve of one side, due to a unilateral affection of the kidney. It will be remembered that at the autopsy on his patient the left kidney was absent. He based his explanation on the opinion of Potain, who believed that the one-sided anasarca of Bright's disease, which has been observed after contusion of the kidney, and also in Bright's disease without such history, was explainable by an abnormal action of the sympathetic nerve. Eales, whose patient also suffered from an injury of the loin, with rapid unilateral retinal affection and albuminuria, is inclined to accept Yvert's view of irritation of the sympathetic as the most plausible, under the circumstances.

Although we have one case substantiated by autopsy in which one kidney alone, in a state of parenchymatous nephritis, was responsible for a unilateral retinal lesion, as Knies remarks, this observation does not permit the inference that in disease of one kidney the retinal affection will be one-sided.

In a case like my own, the starting-point of the disease is apparently not in the retina, but rather in the vessels of the optic nerve, the retinal changes, hemorrhages, spots of degeneration, etc., being secondary to this condition, and I suspect that in some of the other cases reported as unilateral neuroretinitis the same lesions may have been present. It is by no means a new observation. Knies has seen

hemorrhage into the optic nerve of one eye, with blindness, in a case of albuminuria; one year later the opposite eye was attacked by a pure hemorrhagic retinitis. Hemorrhages in the optic nerve have been demonstrated *post mortem* a number of times under these circumstances, particularly in the investigation of Herzog Karl Theodore, and the etiological relation of nephritis to thrombosis of the retinal vein, or one of its branches, is well known.

A point of some importance is the one referred to at the beginning of this paper, namely, that for a time a unilateral retinal or nerve-head lesion in Bright's disease is common; subsequently the ordinary bilateral character of the affection appears. It is probable that some of the reported unilateral cases have been recorded at a time when the visual defect was still asymmetrical, bilateral retinitis occurring before the termination of the case. It will be remembered that Bull, in his series of 103 cases, found that both eyes were affected at the time of the examination in fifty-four, or about half of them, from which we would infer that the other half were unilateral. Of these unilateral cases, however, all but ten of them subsequently became affected on both sides.

Evidently, as Knies has remarked, unilateral albuminuric retinitis is not a rarity, a certain percentage of cases maintaining monocular retinal lesions until death. In another large percentage of cases the unilateral character of the affection is maintained for a considerable period of time, but ultimately becomes bilateral. An interesting clinical observation in these unilateral cases would result from catheterization of the ureters and separate analysis of the urine from each kidney. My patient has thus far declined to submit to this procedure.

INTRAVENOUS SALINE INJECTIONS IN CONDITIONS OF SEVERE SHOCK.

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THE advantages to be obtained by the intravenous injection of large quantities of the "normal salt solution," during or immediately after operations accompanied by much hemorrhage or shock, are now well understood. It is, perhaps, not so well known that similar advantages may be obtained by the same means in cases of injury followed by marked shock, with or without important hemorrhages externally, or into the natural cavities, or among the tissues of the body. The following cases may serve as illustrations:

CASE I.—A. R., aged thirty-one, was struck, December 17, 1895, on the right side and front of the abdomen, and squeezed against a wall, by a piece of structural iron weighing 700 pounds, which he was engaged in moving. He was immediately brought to the New York Hospital. When I saw him, three hours later, the condition of extreme shock, which was present on admission, persisted; the abdomen was tender and distended, the flanks dull on percussion, and a slight intra-abdominal wave could be obtained. There was evidence of an intraparietal hematoma on the right side between the ribs and the ilium. The urine did not contain blood.

Twenty ounces of the salt solution were at once introduced through the median basilic vein. This was followed by a prompt improvement in the general condition; and as the local signs grew no worse the attitude of expectation was maintained. Complete recovery followed.

CASE II.—Chas. A., admitted to the New York Hospital, December 11, 1895, after having just fallen from the third floor of a house. Several ribs on the left side were broken, and there was extensive emphysema of the chest wall; marked shock.

Twenty ounces of the salt solution were injected into the median basilic vein. Recovery.

CASE III.—James S., admitted to the New York Hospital, December 13, 1895, with fresh burns, covering almost the entire body. Extreme prostration. The patient was placed in a hot bath and received a large saline injection, but died 3½ hours after admission.

CASE IV.—William B., twenty years old, was admitted to the New York Hospital, October 23, 1896, having just been run over by a dummy engine. The left foot and ankle were crushed, the joint being widely opened; compound fracture of the right radius; compound dislocation of the right thumb; simple carpo-metacarpal dislocation; profound shock; semi-conscious.

The left leg was immediately amputated, the patient receiving meanwhile a saline intravenous injection of 34 ounces; this brought his pulse down to 88, but an hour later it rose to 160; a second injection of 34 ounces was then given, bringing the pulse to 120. Recovery.

There is also reason to think that similar advantages may be gained by the same means in severe septic conditions. In July, 1896, I saw in the wards of my friend, Professor Pozzi, in the Broca Hospital, Paris, a woman, who had been admitted three days previously, gravely ill with puerperal septicemia. The only treatment had been the immediate administration of a large intravenous saline injection. This was promptly followed by a marked reduction of the temperature and improvement of the general condition, which still persisted when I saw her. The following case may be quoted in connection:

CASE V.—Chas. L., aged twenty-seven, was admitted to the New York Hospital, December 1, 1896, suffering from general peritonitis, due to perforative appendicitis. The attack began on the night of November 28–29th, about sixty hours before ad-

mission. The abdomen was distended, tense, and painful; the surface dusky; the pulse rapid, small, and of bad quality; temperature 102° F. Fecal vomiting.

The abdomen was immediately opened, and the appendix, which had been completely divided near its base by ulceration, was removed. Several ounces of pus from the neighborhood of the appendix was removed, and then a large quantity of turbid serum from the general peritoneal cavity. The intestines were congested, distended, and coated in many places with a fibrinous exudate. The general peritoneal cavity was thoroughly irrigated and sponged with salt solution, drained with gauze and two large rubber tubes, and the wound partially closed.

The patient's condition, as shown by his pulse and surface circulation previous to the operation, occasioned much anxiety. About 24 ounces of the salt solution were injected by an assistant while I was operating. This was followed by an immediate improvement, which persisted through the day. On the following day the general improvement was maintained, and the local conditions were better, the left side of the abdomen being soft and painless. This continued until December 4th, when the vomiting was renewed, all efforts to secure a movement from the bowels having failed. The pulse again became almost imperceptible, the surface dusky, and the nose cool. An injection of 60 ounces was made, and the same improvement followed, but the vomiting persisted, and the patient died early on December 5th. It seems clear to me that in this case the injection prolonged life fully three days, enabled me to perform the operation and check the peritonitis, and only failed to save the patient because of the persistence of the intestinal paresis.

The good effect of these intravenous injections is doubtless due to the change in the physical conditions created thereby; the intra-arterial pressure is increased, and, presumably, osmosis is carried on more freely. Possibly, too, the presence in the body of the large additional amount of water favors metabolism and excretion, and thus diminishes the production of deleterious compounds and aids the removal of those that are produced.

While no direct curative effect has been proved, yet the injection gives to a patient, who apparently has but a few minutes or hours to live, a respite, during which his organism may recover from the shock received, or throw off a septic assault that is pressing, or during which the physician may, perhaps, successfully employ remedial or helpful measures.

The technic is simple. A sterilized, graduated vessel, provided with a rubber tube about three feet long, ending in a fine pointed glass or metal nozzle, is required. The solution can be readily made by mixing common salt and water in the proportion of ninety-two grains (a large, but not heaping, teaspoonful) to a quart, and sterilizing it by boiling. It should be injected at a temperature of about 105° F. The vein should be exposed, a ligature passed beneath it, and the vein opened by snipping it half across with scissors. The water is then allowed to fill the tube, the nozzle is inserted into the vein, and the ligature tied about it so as to prevent slipping. The vessel holding the solution is then raised two or three feet above the patient, and the solution allowed to run in.

Some deem it simpler and equally beneficial to throw the solution into the subcutaneous tissue by means of a syringe and hollow needle, taking pains afterward to distribute the liquid by rubbing toward the heart.

THE SIGNIFICANCE OF PAIN.

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WHAT the study of special forms of disease is to the science of medicine, so is the study of the effects of disease, whatever be its special form, to the practice of medicine. If the characters of an affection are sufficiently definite, it is proper to give it a name to distinguish it from other affections. But this designation of diseases by special names may be in practice a hindrance, rather than a help, if it leads to the treatment of diseases according to their names, because even the most special affections may induce derangements which are common to more than one disease, so as to render the state of the patient, rather than his particular disease, the chief concern of the physician.

Viewed under this aspect, certain common, but important, symptoms of disease assume an interest quite their own, sufficient to warrant their being made the subjects of separate study. Their relation to diagnosis, prognosis, and treatment is often of the first importance, and yet this may be but inadequately appreciated amid the desultory reference to them in the symptomatology of special diseases. As a useful introduction, therefore, to the consideration both of general and of specific morbid processes, I would devote a few lectures to some phases of the general semeiology of disease, as illustrated in the case of certain leading symptoms, whose significance always merits special investigation in whatever connection they may occur.

We begin with the subject of "Pain" as a good example of the advantage which the particular study of a single symptom may afford. In diagnostic value alone it is not to be surpassed by any of the common signs of disease, and it would be well, whenever it is mentioned by a patient, to make it the subject of exclusive attention before proceeding to any other

investigation, until both its nature and significance are as fully determined as possible.

The investigation should begin with a request that the patient show just where the pain is felt most, and where it first began. While he is doing so, the gestures which he uses should be carefully noted, as they often afford truer indications than his language does, because verbal descriptions of pain may be extremely indefinite. As a rule, such gestures are characteristic enough to aid materially in the recognition of the particular variety of pain, if not also of the nature of the affection itself which is present, as the following examples will show.

When the pain is due to inflammation, if external, as with a joint, the patient will avoid touching the most painful part, or he approaches it in a very respectful way. Thus, with an arthritis his hand passes over the joint in a hovering fashion. If deeper seated, the gestures are often expressive of the varying kinds and distribution of the pain, according to the texture inflamed. Thus the diffused soreness of a mucous-membrane inflammation causes the gesture of bronchitis to be made with the whole hand laid on the sternum, and then passed over and across the chest. A similar movement of the hand across the abdomen never means a peritonitis, but a catarrhal intestinal inflammation. With pleurisy, on the other hand, the tips of the straightened fingers are used to indicate the stabbing nature of the pain. In peritonitis, also, the tips of the fingers are used, but brought down with much more caution than in pleurisy. In the localized pain of commencing appendicitis, the open hand is used, as with an inflamed joint. In pleurodynia, the whole hand is pressed firmly to the side, to prevent movement of the ribs. In rheumatic fever, the pointing by the patient to the epigastrium or to the xiphoid cartilage, especially if followed by a movement from the precordium up the neck or into the left arm, is significant of cardiac inflammation. So also the gesture in gastritis, whether acute or chronic, is wholly different from that in colic. Inflammatory pains about the head may have very characteristic gestures. The use of one finger-tip to localize it on the scalp is strongly significant of intercranial syphilis. The finger-tips passing up the side of the face and stopping on the scalp an inch below the sagittal suture indicates a pain ascending from a tooth, and should not be mistaken for a trigeminal neuralgia. In conjunctivitis, the hand is laid over the eye. In iritis, the finger is pointed toward it, not touching it, and then passed up the forehead to the inner side of the nose or to the malar process. In glaucoma, the gesture may be reversed, as if the pain was emerging from the orbit. All these gestures differ entirely from those of head-pains not inflammatory. Meningitis, whether cerebral or spinal, is significantly indicated by absence or suppression of gesture, for reasons to be noted further on. The exceptions to this are in some cases of tubercular meningitis. But the gesture of myelitis, with both hands passed from the back across the abdomen, to describe the cord or band-like sense of constriction, is almost itself pathognomic.

On the other hand, the gestures indicating the seat of the greatest pain produced by pressure, as by tumors, abscesses, etc., or cramps, markedly contrast with those of inflammatory pains in showing no apprehension in touching or in moving the part. Here the locality indicated at first by the gesture is of importance to note, and whether, on repeating the question, the same place is again started from, because the patient's hand then moves in a fashion expressive of the extension or radiation of the pain from the original focus, although he may describe the pain as equally present at some distance from the spot first pointed out. Hence, his unconsciously repeating the sign with which he commenced is of much significance. Thus, a patient with a growth springing from the lumbar vertebræ always first pressed the point of two fingers deeply into the abdomen below the umbilicus, while the fingers of the other hand moved over the sacrum, where he insisted that his pain chiefly was. A fixed pain in the back caused by an aneurism is often indicated by the extended thumb, and likewise the pain preceding herpes zoster, but no spinal inflammatory pain will elicit such a gesture, nor will the pains of so-called spinal irritation.

In stretching pains, such as in biliary or renal colic, or cramps, as in lead colic, the contrast to inflammatory pains is shown by the forcible grasp or pressure which the patient makes on the abdomen, while the characteristic radiations of the different varieties may be very plainly represented. Even when the pain has ceased, the gestures descriptive of what he had experienced may be equally conclusive as to their nature.

The gestures expressive of true neuralgic pains contrast throughout with those of inflammatory pains. A functional occipital headache is shown by a friction-like movement of the hand from the neck up, sometimes followed by pressure on the eyes with the fingers. So the hands are used with the firmest pressure in temporal or frontal neuralgias, or the patient may tightly tie a handkerchief around. This proneness to grasp or to press the aching head, as well as to move the aching part, is characteristic of neuralgic pains everywhere in the body. The gestures are also valuable from their indicating the shifting character of neuralgic pains, enough, at least, to dis-

tinguish them from the more fixed pressure-pains of tumors. Special characters of neuralgic pains are frequently most graphically described by the gestures, as in the darting pains of tabes.

Subjective pains, as in hysteria, are very characteristic in their being more numerous and varied than true objective pains can be, and, secondly, in the inconsistency of the gestures with the often highly wrought description of them by the patient. Both the language and the manner of the patient is more like one telling the tale of a woful past experience than of a present reality.

I might multiply many illustrations of the clinical value of gestures descriptive of pain, toward making a right beginning in diagnosis. I have already implied, however, that pains differ much in kind and in character, and hence the necessity of distinguishing their special varieties. For this purpose, I would classify them into six different forms, as follows:

(1) Pains due to inflammation. (2) Pains due to pressure. (3) Pains due to stretching. (4) Neuralgic pains. (5) Subjective pains. (6) Cutaneous reflex pains.

Inflammatory pains have three great characteristics. The first is that pain is elicited by pressure upon, or by handling the inflamed part, and the rule is that pressure produces the maximum amount of pain at the seat itself of the inflammation. This fact is useful in diagnosis, both positively and negatively. Thus, an inflammatory pain in the leg may be due to peripheral neuritis, to sciatica, to hip-joint disease, to gouty arthritis, to rheumatic arthritis, to muscular rheumatism, or to spinal meningitis, and each one of these may be distinguished from the others by appropriate palpation. In peripheral neuritis, pain is most complained of on pressure upon the skin and superficial structures much more than when you lift the whole limb in your hands or move its joints. Sciatica is diagnosed by the special tenderness on pressure at the sciatic notch, along the course of the nerve down the back of the thigh, or deep in the popliteal space, or between the heads of the soleus in the calf; hip-joint disease by pressing the head of the bone against the acetabulum. I have shown[1] that a gouty arthritis may be distinguished from a rheumatic arthritis by the different points of tenderness about most of the joints in these two diseases. In gout, the tenderness is distinctly most pronounced at the condyles; in rheumatism, along the tendons and at their insertions, and not on the condyles. Thus, at the knees, in acute gout, the condyles are very painful on pressure compared with the rest of the joint, while in rheumatism the most pain is elicited by pressure on the tendon of the quadriceps above and below the patella and on the tendons of the hamstring muscles. This same difference in the points of tenderness between these two affections is also well shown in the fingers. The pain of muscular rheumatism in the leg is shown by pressure or manipulation of the muscles themselves, and this serves to distinguish it from pains in the leg in spinal meningitis, where you may manipulate the muscles without pain, but you cannot move the whole leg without making the patient cry out, or, if comatose, groan out from the pain so caused. On the other hand, a child may complain of severe pain on the inner aspect of the knee, but you press the part and it does not increase the pain, which shows that the seat of the inflammation is not there, but, by proper manipulation, may be found higher up—at the hip-joint. Similarly, a child may complain of constant pain in the stomach, and I have known such a case thoroughly dosed for worms; but tenderness on pressure at the eighth dorsal vertebra showed that it had incipient Pott's disease.

Careful manipulation to locate tenderness will frequently reveal the nature of a trouble which otherwise may be very obscure. Tenderness on pressure along the course of an intercostal nerve may dispose of a diagnosis of heart-disease or, as I have twice known, of cancer of the liver.

So tenderness on pressure, highly located, may indicate the presence of a hepatic or of a renal calculus. In the former case, press the tip of the index-finger deeply down at a spot one inch and a half to the right, and an inch below the umbilical line. In renal calculus, standing behind the patient, first place the thumbs of both hands under the last ribs, and then so spread the fingers over the abdomen that when the patient relaxes the abdominal walls by bending well down you can push the kidneys up toward the spine; then, as he straightens up, press the thumbs in strongly, whereupon, if he has a renal calculus, he will quickly bend over on that side. You may further confirm the diagnosis of a hepatic or renal calculus by putting one pole of a faradic battery on the spine, and then suddenly applying the other with firm pressure at the places just indicated, when you will distinctly elicit the same kind of pain which manipulation does. In appendicitis, much is made of the special tenderness elicited by pressure at what is called McBurney's point, on a line midway between the anterior spine of the ileum and the umbilicus.

The second great characteristic of inflammatory pain is that it is increased by any form of movement of the inflamed part, not excepting its own proper functional movements. The inflamed part, therefore,

[1] "Transactions of the Association of American Physicians," Washington, 1896.

is both voluntarily and involuntarily kept at rest as much as possible. This is done by muscular action, the afferent impression of this pain being reflected to all the associated muscles of the part to restrain their action, and even to muscles which, though not usually connected with the function of the part inflamed, yet may disturb it by their movements. Examples of the first kind are seen in the fixity of joints by the contraction of their muscles whenever and as long as the joints are inflamed, while the latter is shown by both the local or general rigidity of the abdominal muscles, according to the local or general state of inflammation underneath. Thus, comparative palpation made by both hands in the iliac fossæ is of help in the early diagnosis of typhoid fever. You can exclude gastritis as the cause of stomach symptoms if there be no rigidity in the epigastrium. In appendicitis, from the commencement of the irritation the muscular resistance over the cecum may have the feel of a solid tumor much before there has been time for exudation or pus-formation. A number of other characteristic and significant signs are thus developed, which point both to the existence of inflammation and to its seat. There is no part of the body, for example, so often moved for purposes of attention or expression as the head. When, therefore, on approaching a patient's bed, you notice that he turns his eyes, but not his head as well, to look at you, the reason may soon be found in rigidity of the muscles of the neck, owing to meningitis. It is a good sign of improvement in such a case when his head acts naturally with his eyes or nods in assent. A healthy child constantly bends or unbends its back, but a child carefully picking up something from the floor by bending its knees without bending its back should lead you to examine it for vertebral disease. There may be lameness from either arthritis or sciatica in the leg, but the muscular actions are characteristically different in each of these inflammations. I need not say how the movements of the ribs in breathing are watched by us for the same reason in examining for phthisis, pleurisy, or pleurodynia. Hence the muscular accompaniments, so to speak, of inflammatory pain are of much service in diagnosis, because all the other varieties of pain have nothing to do with the muscles. The only exception to this statement is in some cases of hysterical muscular contractions with much complaint of pain; but the other features of these cases enable us readily to distinguish them from inflammatory rigidity.

The third great characteristic of inflammatory pain is that it is accompanied by disturbance of the normal function of the injured part. Now this does not happen with the other varieties of pain, at least as a characteristic of them. Neuralgic headache, for example, is not accompanied by delirium or, ordinarily, by intolerance of light or of sound, as the headache of meningitis is. Neuralgic pains in the spine, in the arms, or in the legs do not produce stiffness nor fetter the movements of those parts, whose chief functions are to execute movements, while inflammatory pains do. So the diagnosis between pleurisy and pleurodynia lies in the fact that the pain on movement of the ribs in pleurisy causes the functional symptom of cough, while that of pleurodynia does not, for the seat of the pain is not in the pleura at all. Again, when a pain in the chest is accompanied by an altered ratio between the frequency of the respiration and the frequency of the pulse, we have strong reason from this significant disturbance of a lung-function to suspect pneumonia. If inflammation of the heart or of the pericardium causes pain, it is always accompanied by signs of disturbed heart-action. So gastritis cannot cause pain without being accompanied by symptoms of gastric functional disorder. The same is true of peritonitis, enteritis, or dysentery. I once wondered why a patient who complained of attacks of severe pain just above the pubis had been twice sounded by surgeons for stone in the bladder, when he showed no signs of disturbed function in the bladder whatever. It proved to be due to chronic lead-poisoning from the prolonged use of a hair-dye.

Besides these three great characteristics of inflammatory pains, the sensation itself often varies in kind, according to the tissue involved. The rule is, the softer the texture the more acute the pain; so that it may be described as only dull and heavy, as in inflammation of the liver or in a pneumonia which has not involved the pleura. In inflammations of mucous membranes, the pain, if moderate in degree, is more like a diffused soreness; if severe, it may be termed burning. Whenever griping or bearing-down sensations develop, it is because the inflammatory irritation has extended from the mucous membrane to the muscular coat of the wall of the canal or viscus which the membrane lines. Pain of inflamed serous membranes is much more acute than in the case of mucous membranes, and is apt to be lancinating or stabbing, as indicated by the patient's gesture. Pain of inflamed fibrous tissues, such as muscular fascia, nerve-sheaths, periosteum, dura mater, etc., if moderate, is of a dull, aching character; but if severe, is very violent, on account of the unyielding nature of the tissue. A serviceable indication of the seat of the inflammatory process is afforded by the susceptibility of patients with any form of fibrous-tissue inflammation to changes in the weather. In health, there is a perfect adjustment between the centrifugal pressure of the circulation and the centripetal pressure of the

weight of the atmosphere. Changes in the latter, as indicated by the fall in the barometer on the approach of a storm, are readily compensated for by the nerve-fibrils being readily removed in the softer tissues from unbalanced intravascular pressure, but not so in the denser fibrous tissues. Hence the good, but inconvenient barometers which a gouty man has in his toes, which may ache worse while the sky is yet clear, but which he knows, from experience, means that the clouds are on their way. So a patient with sciatica finds his bed-covering no protection when his leg wakes him in the middle of the night with its observations on the weather out of doors. It is well, therefore, to ask whether a headache complained of grows worse just before a storm, when you have reason to suspect that it is no mere functional trouble, but a cephalalgia of syphilitic origin.

Inflammatory pain is peculiarly local, and therefore referred to the part inflamed, except when the inflammatory process involves the course of nerves. In that case, it may be radiated either along those nerves directly or to some region in nervous association with the seat of the inflammation. Thus, the pain in ulcerative gastritis is often radiated to the sixth or seventh dorsal vertebræ. Inflammation involving the convex surface of the liver affects the distribution of the right phrenic nerve on the under surface of the diaphragm, and from there may radiate to the top of the right shoulder or between the scapulæ. Inflammation of the vertebræ sends pain to the anterior distribution of the surface-nerves. Inflammation of the kidney radiates pain to the testicle and down the inside of the thigh, while inflammation of the fundus of the bladder produces pain felt in the head of the penis. In some cases of inflammation of the prostate, pain is felt in the sole of the foot. In every case, however, these pains can be proved not to belong to the region to which they are referred by the fact that the patient has no objection either to movement or pressure of the part.

The treatment of inflammatory pains is that of the inflammation itself, and hence often different from, if not the reverse of, the treatment of other kinds of pain. The first indication is rest, including the position which assures most rest. After a rheumatic carditis, the patient had better stay three or four months in bed if he still has cardiac pains and a quickened pulse. Nothing is more serviceable sometimes in the later stages of pleurisy than to limit as much as possible the movements of the ribs by firmly strapping the whole affected side of the chest. But the instances in which this principle can be applied are too numerous to mention here. In many acute inflammations, the vascular sedative action of topical blood-letting is often remarkably effective in relieving the pain. On the other hand with the pains of chronic inflammations, the stimulant effect of counter-irritation is preferable, according to the rule that the indications in the treatment of chronic inflammations are the opposite of those for acute inflammations. In traumatic lesions, both the pain and the inflammation are generally treated best by the local application of ice-bags, but cold is useless when the inflammation is due to a general cause in the blood, as in rheumatic and gouty arthritis. Cold applications should be discontinued at once if they cause a neuralgic pain to take the place of an inflammatory pain. Many internal inflammatory pains are best relieved by the sedative properties of moist heat applied to the surface, as by poultices, etc., according to the general law that the cutaneous sensory nerves are always in association with the vascular nerves of the parts underneath. The great drug for inflammatory pains is opium. Next comes aconite, especially in serous membrane and cardiac inflammations. The coal-tar analgesics, so valuable in the other kinds of pain, are comparatively useless in inflammatory pains.

CLINICAL LECTURE.

ANEURISM OF THE AORTA; HYSTERICAL HIGH TEMPERATURE; TREATMENT OF PNEUMONIA.[1]

BY A. ALEXANDER SMITH, M.D.,
OF NEW YORK;
PROFESSOR OF PRINCIPLES AND PRACTICE OF MEDICINE AND CLINICAL MEDICINE IN THE BELLEVUE HOSPITAL MEDICAL COLLEGE.

CASE I.—This woman is forty-two years of age, has been in this country ten years, is married, and has had several children. She gives a history of having been in good health up to within three months. She then began to complain of pain extending from the lower sternal region to the right side. There was a moderate amount of cough and shortness of breath, the latter becoming more and more pronounced. There is no specific, rheumatic or alcoholic history, and none of accident. I speak of these things in order to exclude certain points in etiology. She has just walked upstairs, and although it has made her short of breath, it has not, apparently, added much to her pain. She has coughed two or three times within the last fifteen minutes.

She seems well nourished. Her countenance appears somewhat anxious, but that might be due to nervousness on coming before so many strangers. The eyes are a trifle prominent. There seems to be a little cyanosis about the lips, but that may be due to dilatation of the venous capillaries. Where shall we look for the cause of her symptoms—in the heart or lungs? The heart is enlarged, but without any valvular lesions. She has never spat blood, and has never had any pulmonary trou-

[1] A clinical lecture delivered at Bellevue Hospital.

ble, except this shortness of breath. You will notice, on inspection of the chest, aside from the difficulty of breathing, that there is a fulness above the sternum. But she is forty-three years of age, and is pretty stout, and in stout people we often see such fulness, it usually being of no special significance. I have said she has no pulmonary disease, and there is enlargement of the heart, without valvular lesion. What can cause enlargement of the heart without valvular disease? Possible causes are cirrhosis of the liver, contracted kidney, arterial sclerosis, and tumor. Having excluded the first three, how might a tumor bring about this condition? It would probably have to be in the thorax, and near enough to the heart to produce obstruction, as happens in disease at the aortic orifice. The heart has to act with increased force to overcome the obstruction.

We have already determined the presence of some enlargement above the sternum, and on palpation we find a slight pulsation in this region, but this might be present without a coincident lesion in a nervous or anemic person. The transverse portion of the arch of the aorta is near to the finger when palpating in the suprasternal notch. The pulsation felt is not an expansile one. On percussion we find dulness, amounting almost to flatness, at the right of the upper third of the sternum. Auscultation, with the aid of the stethoscope, reveals a roaring sound or hum, which occurs practically with the first sound of the heart. It would not do to puncture the tumor to determine whether it is an aneurism or not. A few years ago a colored man came here with a huge tumor in the upper portion of the thorax. It fluctuated, and a physician had told him to poultice it for another forty-eight hours and he would then open it. The patient entered the hospital with an aneurismal tumor thirteen inches in diameter, the largest on record.

Having determined the presence of the tumor, how are we to know that it is an aneurism? By more careful palpation over the area of thoracic dulness, pressing the fingers between the intercostal spaces, and aiding them further by pressure with the other hand, we find an expansile pulsation in the tumor synchronous with the cardiac systole. The second sound of the heart is very loud and is accentuated. The pulse in the right radial artery is much more feeble than that in the left. While this might occur in connection with any mediastinal tumor, it is so much more likely to be met with in cases of aneurism that it constitutes further evidence in favor of our diagnosis. She has practically no cough. The tumor might press upon the recurrent laryngeal nerve and cause paralysis of the vocal cord, usually of one side only, but in this instance the larynx has been examined, and no paralysis has been found. She has marked diminution of the respiratory murmur, extending down the right side. This condition is not always present in aneurism, but the sign is of value in connection with the others when it is present. There is no specific history in this case, as there is in most cases of thoracic aneurism not due to traumatism. We do find it occasionally in persons with simply a rheumatic or gouty history. Anything that will produce endarteritis may produce aneurism, but syphilis is the most frequent cause.

The patient has an aneurism at the junction of the ascending and transverse portion of the arch of the aorta—the most frequent seat of thoracic aneurism. It is the most frequent seat, probably, because it is at this point that the blood first meets with resistance; it is the first point where it turns the corner after leaving the left ventricle. There are a good many other points of interest in connection with the subject of aneurism, but the one of special interest in this case is that the woman was able to come here and walk up the stairs with such slight discomfort, considering the size of her aneurism.

CASE II.—We have here a patient whose case presents a number of points of interest, but one in particular, to which I wish to call your attention. She came into the hospital about a year ago with an attack of acute articular rheumatism, and along with it evidences of a chronic endocarditis, the result of a former attack of the same disease. There was evidence of lesions at the aortic and mitral orifices, and the heart was very much enlarged, hypertrophy predominating over dilatation. Compensation was ordinarily good. She still has a double lesion at the mitral orifice, as well as a double one at the aortic. Secondary to this, or as a result of the damming back of blood in the pulmonary vessels, she has dilatation of the right ventricle, with tricuspid regurgitation. One would think that was enough, but, in addition, she has a moderately enlarged spleen and a very decidedly enlarged liver, and also gives evidences at times of a passively congested kidney, but all of these are secondary to the cardiac disease. She has also had several attacks of pulmonary edema, and three days ago became very much excited, and had palpitation and evidences of want of heart-compensation. Pulmonary edema developed, and her temperature, in the evening, was found to be as high as the thermometer would register—in other words, 112° F. The house-physician thought there might be some error, and took the temperature again, this time in the rectum, and again it went up to 112° F. Thinking to still further corroborate the observation, he took the temperature with another thermometer, and with the same result. That was three days ago. The next day the temperature was up to 104.6° F., and last night it was 108° F.

The case is of special interest, since we were told a few years ago that a temperature of 108° F. was inconsistent with recovery; yet here is a patient with advanced cardiac disease, and with her viscera passively engorged, who will develop such a degree of temperature and recover from it, notwithstanding all of this crippling of her organs. I am surprised that she can have a temperature of 112° F. and not only survive, but be practically in the same condition as she was before. Cases in which excessively high temperatures have been recorded have been usually in connection with hysterical patients. This patient is to be classed in that category. Some of you may remember that I have cited a case reported by a gentleman of high authority, where the temperature of a male patient rose to 122° F. Another case was reported at a meeting of the Association of American Physicians and Clinicians in which a thermometer was made especially for a patient, the temperature rising to 148° F. In each of these cases

there was an hysterical element. It would seem that in hysterical patients there is a sensitive condition of the heat-centers that, under certain conditions, is conducive to a very high degree of temperature. In this instance nothing was done to lower it, and the patient soon recovered her normal status.

CASE III.—We have here an Italian who was brought to the hospital in a cyanosed condition, and with evidences of consolidation of the upper and middle lobes of the right lung, believed to be pneumonia. He was put to bed at once and given ordinary treatment. The temperature ran high, ranging from 104° to 106° F., and the pulse was dicrotic. On account of the cyanosis the house physician had oxygen administered freely, and, in addition to sustaining treatment, he was given baths. When I saw him I decided to try a plan which I had seen work well before. All treatment was stopped, and cold compresses were applied to the side, extending from the axilla down to the free border of the ribs. Over the compress a towel was placed, and over that oiled silk, the latter for the purpose of keeping the bedclothing dry. The compress was made of a folded sheet, and was dipped in water at a temperature of 70° F. I gave instructions not to hesitate to resort to other means of relief should bad symptoms arise. His temperature began to come down within two hours, the compress being changed every hour during the day, and every two hours at night. The pulse became less frequent, more powerful, and lost its dicrotic character, and he became a great deal brighter; he could sleep, his whole appearance changed, and the cyanotic condition, which had already improved under the oxygen, improved still further. This treatment, by cold compresses alone, was tried somewhat as an experiment. As you know, I am not much of a believer in local applications in pneumonia. It certainly does not seem rational that we can make any applications around the thorax which will directly affect the internal organs. I am inclined to think that as much benefit will come from wrapping the wet cloths around the abdomen, and I have made up my mind to try it. I will make the application to the same amount of surface as upon the thorax, and will see whether the same result will follow. I admit that if there is pain, the putting on of a pretty tight compress will give a certain amount of relief, and the patient can then breathe more deeply, just as would happen if one were to put on strips of adhesive plaster. Simply pinning a cloth tightly around the chest will have some beneficial effect. Of course, the application of cold compresses is simply a modification of the bath treatment. It is more comfortable, and is easier to carry out, and the applications are made oftener.

Vaccination in Great Britain.—The government bills to be introduced in Parliament at its next session will include a measure exempting from vaccination the children of parents who have conscientious objection. Government inspectors are now visiting calf-lymph stations on the Continent to ascertain the best means of preparing and distributing calf-vaccine, the use of which by doctors the government is being strongly urged to make compulsory.

CLINICAL MEMORANDUM.

REPORT OF A CASE OF ANTHRAX CARBUNCLE.

BY M. G. MOORE, M.D.,
OF VINCENNES, IND.

ALTHOUGH the typical anthrax carbuncle is not likely to be confounded with any other affection, diagnosis is apt to be delayed on account of the extreme rarity of the disease in this country. In persons employed in handling wool and hides, the physician is on his guard, and diagnosis is usually made early, but in cases in which the occupation of the patient furnishes no clue, the disease is very likely to get beyond control before its gravity is recognized. We know, however, that the disease does occasionally occur in our country, that early diagnosis is essential to its successful treatment, and that treatment, to be efficient, must be prompt and radical.

The case which is here reported occurred in a man, aged thirty-nine, proprietor of a livery-stable, and prior to this infection in excellent health. The source of infection is doubtful, though it may be stated that a few days prior to the appearance of the lesion, the patient had spent two days at a sale of Texan horses, and had been among the animals much of the time. It is not known, however, that any of the horses were diseased in any way. Nevertheless, it is possible that an animal may carry the disease without itself being infected, and we may conclude that in this we have the probable source of infection.

On July 13th, there appeared on the patient's face, at the point of the cheek-bone, a minute, dusky-red papule, with burning and itching, out of proportion to the size of the eruption. On the second day, the eruption assumed a vesicular form, the burning and itching being entirely gone. On the third day, the vesicle burst, disclosing a central eschar as large as the end of a lead-pencil. Up to this time there had been no symptoms aside from the local lesion, but on the evening of the third day, the patient experienced marked rigors for about two hours, followed by mild fever, accelerated pulse, headache, and general aching, especially of the limbs. From this time the patient was confined to his room, though able to sit up most of the time. By the fourth day the eschar was enlarged to the size of a penny, presenting a tough, grayish, sloughing surface, from which continually oozed clear serum. An area of induration extended for a considerable distance around the lesion; about a third greater than a silver dollar in circumference, of a decided purplish color, stony, hard, and absolutely painless. Outside of this area of induration there was much swelling, extending to the orbit and the corner of the mouth anteriorly, to the zygoma above, to the ear, and involving the parotid posteriorly, and to the lower border of the jaw below. The enlargement of the parotid was painless, though two small cervical glands just back of the angle of the jaw were enlarged and quite painful on pressure.

On the fifth day of the disease, the eschar was the size of a silver quarter, distinctly umbilicated, and around the margin there developed a secondary ring of small vesicles,

with gradual extension of the tissue-necrosis. During these days the general condition of the patient became steadily worse; complete loss of appetite, feeble and rapid pulse, fever continuing at about 102° F., rising half a degree to a degree in the evening, and on the evening of the sixth day there occurred a well-marked chill, followed by a temperature of 103.8° F., intense headache, and great prostration. The lesion and the general condition of the patient for the succeeding thirty-six hours remained practically unchanged, and until the morning of the ninth day, when the swelling and induration of the infected area began very slowly to subside, and the patient's general condition to improve, though there was slight elevation of temperature to the fourteenth day.

The local treatment consisted of the injection of 30 minims of a seventy-five-per-cent. solution of carbolic acid at various points about the base of the indurated area, as soon as diagnosis was made. The needle was introduced as far as the center of the lesion, and the injection made as it was slowly withdrawn. No toxic

Cover-glass preparation from slough showing (*a*) anthrax bacilli, (*b*) pus-cells with nuclei, and (*c*) free nuclei.
Zeiss' aprochromatic objective, one-twelfth; ocular, six.

symptoms appeared from the carbolic acid. The infected area was frequently cleansed by washing with strong bichlorid of mercury solution, and was kept constantly covered with cloths wet in bichlorid solution 1–500.

The general line of treatment was supportive, consisting of frequent doses of quinin and iron, together with whisky in the form of egg-nog and milk-punch. The administration of strychnia and digitalis was necessary to sustain the action of the heart, which was at all times feeble. The patient made a good recovery, with remarkably little sloughing or scarring, either from the lesion or the carbolic-acid injections. Diagnosis in this case was verified by bacteriological examinations made before radical treatment was begun, and the characteristic bacilli of anthrax were found in a number of preparations.

Cover-glass preparations, stained with methyl blue and mounted in glycerin, were made from the serum which continually oozed from the central eschar, from the semi-purulent contents of the vesicles in the secondary ring, from blood drawn from the margin of the sloughing area, and from the slough itself, the accompanying drawing being made from the latter. In all these preparations, the bacilli of anthrax were found in considerable numbers, being most numerous in the slough, and least so in the blood drawn from the margin of the slough. Examination of blood drawn from within two inches of the base of the indurated area revealed no bacilli, clearly demonstrating an effort on the part of Nature to circumscribe and limit the infection by this wall of indurated tissue; an effort on the success of which depended the life of the patient.

On the third day following the carbolic-acid injections, examinations were made identical with those made at first, and no bacilli were found, proving the efficacy of carbolic acid in the destruction of this, the most tenacious of life of all bacterial organisms. Although the recognition of the spores of anthrax alone in tissue under these circumstances is almost if not quite impossible, it is reasonable to conclude that their destruction was also complete. We may therefore conclude that in carbolic acid, if employed early and in strong solution, we have a safe and efficient means of combating this malignant disease.

MEDICAL PROGRESS.

The Production of Streptococcus-antitoxin by Means of Electricity.—As the result of an experimental investigation conducted at the Institute for Pathological Anatomy of the University of Padua, BONOME and VIOLA (*Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, 1896, Nos. 22, 23, p. 849) have determined that alternating electric currents of high tension are capable of rendering innocuous most virulent cultures of the *Streptococcus-pyogenes*, without modifying the chemic reaction of the cultures or the form of the parasites. The result is brought about even when the current passes but for a short time, and it is constant. The action of the current takes place only upon the fluid portion of the culture, *i. e.*, upon the dissolved toxins rather than upon the streptococcus. The latter, when inoculated upon new media, develops with its previous rapidity, and retains its pathogenic activities. The streptococcus is capable of preserving its vitality for two weeks in the electrified culture. Under the influence of the current the toxins of the streptococcus are converted into antitoxins, just as antitoxins are produced in the bodies of immunized animals. The antitoxins obtained through the electric current from old cultures of the streptococcus possess great activity, being capable of neutralizing outside the body ten times the lethal dose for rabbits. The antitoxins obtained from recent cultures are weak, because these contain only a small amount of toxins capable of conversion into antitoxins. These antitoxins possess active protective and curative properties with regard to streptococcous-infection in rabbits. They behave like true vaccines, and like the vaccine obtained by heating streptococcous-cultures to between 126° and 150° F., are not entirely innocuous for rabbits, producing a progressive marasmus and at first elevation of temperature. The

antitoxins probably act in the rabbit by stimulating the formation of substances capable of destroying the streptococcus outside of the body by causing degeneration of the streptococci.

An Unusual Cause of Lead-poisoning.—At a recent meeting of the Société de Biologie, CHARCOT (*Compt. rend. hebd. de Séances de la Soc. de Biol.*, 1896, No. 22, p. 639) related the case of a woman, thirty-two years old, employed in the manufacture of artificial flowers, who presented characteristic manifestations of lead-poisoning. There had frequently been colic, with obstinate constipation. Careful examination failed to disclose the existence of a blue line at the margin of the gums, but the mouth was well cared for and the teeth were in good condition. The woman was pale and emaciated. On inquiry it was learned that in her occupation she wrapped the stems of artificial flowers with green paper, often wetting her fingers with the tip of her tongue. An analysis of the paper used disclosed the presence of lead in large proportions. The case was used also to illustrate individual susceptibility to lead-poisoning, as the woman knew of none of her associates who were similarly affected.

A Simple but Successful Treatment of Colles' Fracture.—In the *Archiv für klin. Chirurgie*, vol. liii, p. 336, the results of a simple method of treatment of Colles' fracture of the radius, as carried out in the Königsberg Polyclinic, are given by STORP. This treatment is essentially the same as was advocated many years ago by Sir Astley Cooper, *vis.*, the suspension of the arm by the wrist, the hand being allowed to drop sharply to the ulnar side. Storp insists that attention should be directed especially to the complications of a Colles' fracture, and not to the fracture of the radius. In almost any decently applied apparatus the bone unites rapidly and firmly. On the other hand, the complications, such as rents in the joint-capsule, made by splinters of bone, or openings into the posterior or anterior tendon-sheaths, or injury to the triangular ligament or its attachments should be attended to. In all such cases, if the hand remain too long in splints, organization of blood-clots and the formation of adhesions in joint or tendon-sheath delay complete recovery, or possibly permanently disable the hand. To avoid this, the fingers are now almost universally left free, and massage applied at an early date.

Storp has treated 104 patients in this manner: A strip of rubber-plaster, 2½ inches wide, is wound about the arm just above the wrist-joint. A second piece is placed exactly over the first, a fold being made in it on the radial side, which stands out far enough from the arm to allow a large hole to be made in it. Through this hole a string is passed, and the arm is held high up on the chest, the hand dropping downward toward the ulnar side.

The treatment is at first rather painful, but if the arm is kept high up venous congestion is avoided, and the pain becomes much less. The plaster is removed in ten days and the hand simply placed in a sling, while the patient is advised to use it carefully. In a few of Storp's cases, in which there was extensive hemorrhage, massage was employed. The average duration of treatment was three weeks, while fourteen to eighteen days sufficed in patients under twenty years of age.

The results were exceptionally good. Of the ninety-five cases in which directions were carried out, the arms of ninety-one were completely restored in appearance as well as function; in the other four the functional result was a good one, but there was a slight radial deformity in three cases, and a rather marked radial deformity in the fourth.

Ozena and Its Treatment by Electrolysis.—BAYER concludes an interesting article on the cause and best treatment of ozena (*Münch. med. Wochensch.*, No. 33, 1896) as follows:

A. Ozena is a trophoneurosis consisting of (1) an anomalous secretion of the mucous membrane of the nose, naso-pharynx, and pharynx, whose product serves as a culture medium for a microbe peculiar to ozena, and producing the odor so characteristic of that disease; (2) a disturbance of nutrition, with atrophy of the mucous membrane; (3) a rhinitis, usually at first hypertrophic, which is brought about by the irritation of the secretory products, these acting as foreign bodies. *B.* The best, one might say the specific, treatment of ozena is by electrolysis, which, however, is not absolutely free from danger.

Bayer insists on absolute cleanliness. The careful removal of all crusts and the frequent use of nasal douches of lukewarm water, or mild antiseptic solutions, precede the application of electricity. The positive pole, a copper electrode, is introduced into the nose, and by means of a relatively weak current and oft-repeated treatment, this obstinate disease may be completely cured. He prefers a weak current as being safer than a stronger one, but its therapeutic action is slower.

The action of the electricity is threefold. First, the oxychlorid of copper is set free into the tissues and produces chemical effects there. Secondly, the electric current has been asserted by some to be an active germicide. Thirdly, and upon this the author lays especial weight, by the "deep molecular disturbance," which the current brings about, the nerve-endings are affected, and as a result a trophoneurotic reflex-action is produced, more blood flows to the mucous membrane, the excretion becomes more fluid, and no longer furnishes a medium for the growth of the ozena-microbes. Be the theory as it may, the results of this treatment were in every way satisfactory.

Treatment of Simple Ulcer of the Stomach.—At the recent Congress of Physicians at Hamburg (*Berlin. klin. Woch.*, November 2, 1896), RATJEN expressed himself as dissatisfied with the usual treatment for ulcer of the stomach, such as rest in bed, hot poultices, fluid diet, and bismuth subnitrate and morphin, on the ground that the benefit thus obtained is more apparent than real, and that relapses often occur. He therefore advocates rectal feeding. For about ten days nothing but a little water or bits of ice, or weak brandy and water, is given by the mouth. The patient is kept in bed and poultices are applied. Under these conditions he believes that the shrinking of the stomach and the diminution of its motions, and

the lessening of the secretion of hydrochloric acid favor the rapid cicatrization of the ulcer.

Bimanual Examination of the Bladder.—HENRY MORRIS emphasizes in the *Lancet*, October 31, 1896, the diagnostic value of bimanual examination of the bladder under ether. Naturally, such examination can be more perfectly carried out in the female than in the male, but as digital exploration of the female bladder is a still more satisfactory, and yet entirely safe procedure, it is in the male that bimanual palpation finds its chief place, and especially in those cases where, on account of hemorrhage, a satisfactory systoscopic examination is not possible.

Morris cites three cases, two of papilloma and one of an ulcerated cancer of the bladder, in which, under an anesthetic, with one finger in the rectum and the other hand pressing the previously emptied bladder into the pelvis, he was enabled to make a correct diagnosis. The cancer felt like a small, hard, flat mass about the prostate and a little to one side. The papilloma had a spongy feel. Suprapubic cystotomy was performed in each case. In not one of the three cases had Morris been able to make out anything abnormal by rectal examination alone without anesthesia.

The Bacteriotherapy of Malignant Tumors.—As the outcome of rather extended clinical observation in the surgical clinic of the University of Heidelberg of the result secured in the treatment of inoperable malignant neoplasms with the toxins or with the antidotal serum of the *Streptococcus pyogenes* and the *Bacillus prodigiosus*, PETERSEN (*Archiv. für klin. Chir.*, B. liii, H. 1, p. 184) has arrived at the conclusion that in the treatment of carcinomata either of the methods is entirely without promise, while in the treatment of sarcomata success is only exceptional. Against this slight and dubious advantage must be placed the dangers of intoxication, as well as those of stimulation of the new growth to increased activity.

THERAPEUTIC NOTES.

Dysmenorrhea with Menorrhagia.

℞ Tr. hydrastis canaden. } aa . grm. xv (℥ iv)
Tr. viburnum prunifol. }
M. and sig. 10 drops every two hours, in sweetened water. HUCHARD.

Phthisis Pulmonalis.

℞ Iodoform } aa . . . grm. v (gr. lxxv)
Creosote }
Turpentine } aa . . grm. ii (gr. xxx)
Ac. benzoic }
Powd. marshmallow } aa . grm. vi (℥ iss)
Magnesia }
Make 100 pills; 4 to 10 a day. LEGROUX.

For Leprosy, BROCQ is in the habit of administering oil of chaulmoogra, internally. Five drops are given morning and evening, as a commencing dose, either before or after eating. The dose and frequency of taking is gradually increased until the patient is taking from 120 to 200 drops a day, usually in four doses. This large quantity is continued for three days, and excellent results are said to follow its use. The oil may be given in hot tea or coffee, in an infusion of peppermint, in capsules, or in unleavened bread.

Treatment of Acute Tonsillitis.—The following plan of procedure is recommended by GRASSET (*Gaz. hebdom. de Med. et de Chirurgie*, 1896, No. 66) in the treatment of acute tonsillitis:

Milk is given every two hours, day and night.

Every two hours a teaspoonful of the following mixture is to be administered:

℞ Potassium chlorate . . 16 grains
Water . . . . . 1 fluid ounce

During the day the throat should be gargled frequently with a hot infusion, or with the following combination:

℞ Sodium naphtholate . . 5 grains
Cocain hydrochlorate . . 1½ grains
Sirup . . . . . 1 fluid ounce

The throat should be painted three or four times during the day with

℞ Glycerin . . . . 4½ grains
Borax . . . . . 1 dram

If the local condition should become alarming silver nitrate, 1–10, should be applied topically, and the throat sprayed with carbolized water or a solution of phenosalyl, 1–100. If the pain is severe, especially on deglutition, the throat should be painted three or four times a day with

℞ Cocain hydrochlorate . . 8 grains
Glycerin . . . . 1 fluid ounce

The treatment may be begun with ipecac if this drug have not already been given. The patient should be isolated and separated, especially from children and those susceptible to tonsillitis.

The latter may receive by spray, morning and night, two fluidrams of the following solution:

℞ Cocain hydrochlorate } each . 7½ grains
Carbolic acid }
Glycerin . . . . 6 fluidrams
Water, sufficient to make . 1 pint

Or the throat may be painted daily with

℞ Tincture of iodin } . . equal parts
Glycerin }

By the mouth sulphur and arsenic are alternated from month to month. For twenty days a half-glass of some sulphurous water is taken each morning on an empty stomach. This is also used as a gargle. The patient then rests for ten days. At the expiration of this time he takes twice daily, for the next twenty days, a tablespoonful of

℞ Sodium arsenate . . . 1½ grains
Distilled water . . . 10 fluid ounces

Then again the patient rests for ten days, and the alternation is thus kept up. Tobacco and alcohol are to be abstained from. Chilling, and association with cases of tonsillitis are to be avoided. If possible, a visit should be made annually to some sulphur resort. In case of frequent recurrence of attacks, recourse should be had to the galvano-cautery, or amygdalotomy, according to the size of the tonsils.

THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

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SATURDAY, DECEMBER 19, 1896.

DIPHTHERIA-ANTITOXIN — INVESTIGATION BY THE MEDICAL NEWS.

As a purely scientific enterprise, the MEDICAL NEWS has undertaken during the past few months an investigation to determine the quality of the diphtheria-antitoxin that was being supplied to physicians in different parts of the country. The results of the investigation are set forth in this issue of the NEWS.

What position antitoxin shall occupy as a therapeutic agent is the great question of the hour. Statistics have been gathered and collective investigations have been undertaken to settle it. The fact must be recognized, however, that the value of these statistics rests primarily upon the quality of the serum used. In undertaking this investigation, therefore, the NEWS felt that it was laying hold of the very root of the matter. And out of this was to come an explanation of the great diversity of results experienced by different practitioners. In this we were not mistaken, as the accompanying report conclusively shows. Indeed, the prominent fact brought out by the investigation is the striking irregularity exhibited by the different preparations. Two or three of the samples were so feeble in antitoxic properties that they were practically worthless for therapeutic purposes. More of them however contained greater antitoxic properties than fell below the strength stated upon the label. But for statistical purposes, and as a basis upon which to establish a system of accurate dosage, this is certainly to be deprecated. In determining also how great a part the antitoxin plays in producing unfortunate sequelæ this variation in strength renders statistics utterly void. It is also of interest to note that in some of the samples the strength of the antitoxin was not given upon the labels, so that the physician was necessarily in the dark regarding the strength of the preparation he was using.

One of the most difficult problems in connection with serum-therapy from the onset has been the question of accurate dosage. If to the lack of knowledge regarding the amount required by the patient, uncertainty as to the strength of the antitoxin used must be added, the general practitioner will be hopelessly confused. This, however, is not a necessary condition nor need it be a permanent one, although it now adds greatly to the difficulties that exist in the practical application of this remedy.

It is well known that serum drawn from different horses varies greatly in its antitoxic properties, and it is only by the greatest care that the strength of the serum can be accurately ascertained. Each lot must be tested for itself. It is probably in this department of the work that carelessness has existed. These tests must be made by one of great experience and with great care, otherwise they are of little value. The profession can justly demand that each and every package of serum sent out of a laboratory shall not only bear the personal guarantee of an expert, but that this shall be something more than a formality.

It should be understood by the manufacturers of antitoxin that what the medical profession wants is not a cheap product, but one that is absolutely reliable. Every one knows that to produce a standard antitoxin there is required expert knowledge, the expenditure of a considerable amount of time, and the greatest care. All of these naturally increase the cost of the remedy; but the physician and the public will cheerfully bear such expense if they can be certain of the quality of the article.

How the present condition is to be remedied in a country like ours, where there are no governmental

restrictions whatever upon the manufacture and sale of products like antitoxin, is difficult to say. The only means which the average physician has of knowing what is being furnished him in the way of antitoxin, is by just such an investigation as this which the NEWS has inaugurated, and it is our purpose to repeat this from time to time, and give our readers the benefit of it.

So many sources of error exist in the method now employed for testing serum, that unless they can be eliminated some new method must be devised. It has recently been discovered that under the influence of the electric current the toxins of the streptococcus are converted into antitoxins. Is it not possible that out of some such suggestion a method of determining the strength of serum by this wonderful agent may be devised?

The well-known ability and professional standing of Dr. Abbott are a sufficient guarantee that the work assigned to him in this investigation has been done with care and thoroughness, and the thanks of the NEWS are due him for the scientific manner in which he has performed his task. The editor also desires to express his appreciation of the generous spirit shown by the publishers, Messrs. Lea Bros. & Co., in making possible this investigation, and the cordial support he has received at their hands throughout its entire prosecution.

THE PASSING OF THE PHYSICIAN.

IT needs no prophetic eye to see the extinction awaiting the practicing physician, using the term in contradistinction to the hospital or dispensary physician. Surgeons, aside from professors and hospital and dispensary surgeons, are already extinct. The drag-nets of ambulance, dispensary, clinic, and hospital, have secured such a "corner" in surgery that no man outside the chosen few can make a living.

What has occurred in surgery is now occurring in medicine. No patient able to walk or ride in a cab need pay a cent for medicine or treatment. If slightly hesitating on the brink, the mælstrom of dispensary, clinic, or hospital, will suck him into its hungry and capacious maw, from which nothing is ever vomited back but statistics. If too sick to walk or ride in a cab, an ambulance waits to carry him tenderly, and without shock or exposure, to sumptuous hospital apartments, built possibly by misused funds donated to the hospital for charity. Ambulating and portable sick people being thus provided for, there remains only a small class of the desperately sick whose removal might mean death. To provide for these cases it is only necessary to slightly enlarge the staff of out-door visiting physicians already attached to our dispensaries and hospitals, and *Presto!* the thing is done! And the weary and struggling outside general practitioner can go home, shut himself up with his emaciated wife and starving children, and turn on the unlighted gas.

These words are not written in jest, but embody the sober thoughts of one who has for twenty years watched the growth, abuse, and degradation of medical charity, hand in hand with which have increased the hardships of the general profession. Let the incredulous glance at a few figures.[1] In the year 1893, 75,094 patients were treated in the hospitals of New York City; during the same year 680,789 patients were treated at clinics, dispensaries, and out-patient hospitals. If we make a liberal allowance for reduplication, there will still remain a stupendous and staggering array of figures.

In the same year there were in the city 2842 "regular" practitioners of medicine. The number of "Homeopaths," Eclectics, "root and herbs," and quacks, was not obtainable, but it probably nearly equaled the list in the "Medical Register." Putting a very liberal estimate upon the number of people trying to get a living out of the pursuit of medicine, they numbered in that year probably 4000 souls. The population of the city was about 1,800,000, which would give each medical man or woman a *clientèle* of about 450, *provided* an equal distribution was made. Such, however, has not been the case. The professors, and the hospital and dispensary physicians get about one-half, the clinic, the hospital, and the dispensary the other half, and the struggling outsider gets the rest.

The remedy? None is available. Experience has repeatedly shown us that *unanimous* and *persistent* action on the part of doctors is impossible. Let a board of governors of any hospital or dispensary dismiss its attending staff because of a meek and proper assertion of rights, and however flagrant and arbitrary the action, other doctors will fall over each

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[1] The statistics of Dr. Landon Carter Gray in the recent issue of the MEDICAL NEWS are more recent than these, and confirm the belief that the condition is growing worse.

other in their haste to thrust their necks into the apparently welcome yoke.

The average doctor is servile and shortsighted to an extraordinary degree, bent not only upon his own destruction, but also upon endangering the entire fabric of a noble and benevolent profession. Even plumbers and members of other trade-unions protect themselves by curtailing apprenticeship and by keeping out ignorant cut-throats. Why shouldn't doctors? But it is too late! Even now as we near the vortex of muddy competition, and as we are about to go down for the last time, we must acknowledge a bitter justice in our fate; for years of neutrality and final servility have taught pompous laymen, who pose as public benefactors and philanthropists, that doctors will stand any amount of robbery and degradation to secure and keep a hospital or dispensary position.

THE FUNCTION OF THE PITUITARY BODY.

THERE is always a special fascination about endeavors to penetrate into hitherto unknown territory. Whether it be Darkest Africa, the deepest recesses of the thyroid, or the innermost stroma of the adrenals, its very mystery lends a charm to the investigation. Ten or fifteen years ago, the three sphinxes whose riddles the anatomist-physiologist needs must answer were the tonsil, the thyroid, and the spleen. Their massive fronts have, however, been attacked with such vigor and effect that the first two can scarcely be said to be puzzles any longer, while the third is pretty certainly known to be either the cradle or the grave of the red blood-cells, and is probably both. The researches and dramatically fascinating discoveries of Metschnikoff have prepared us to appreciate the value of the tonsils as breeders of leucocytes, to "health-officer" the upper part of the alimentary tract after the fashion of Peyer's patches in the lower. This also beautifully explains the frequency and certainty with which they are to be found in the very front rank of every brush with the enemy in these regions, especially if he happens to be that Apache of the sewers, the Klebs-Loeffler bacillus.

The discovery of the possession of protective, trophic, and other similar properties by the blood-serum, and the recognition of the nature of myxedema and goiter, together have led us to understand the thyroid as the great "organizer" of the body-tissues. Through its metabolic action upon the blood-plasma, it keeps all the tissues constantly stimulated to their highest pitch of effort, and prevents their relapsing to the embryonic or myxoid state, which they promptly proceed to do when its influence is withdrawn. Myxedema would appear to be a reversion of the fixed tissues to the ameboid stage.

But we need not, like Alexander, sigh for more worlds to conquer, for another Africa has already loudly challenged the attention of biological explorers—the so-called pituitary body, or *hypophysis cerebri*. Here is absolutely virgin soil for the physiologist. Until within the last ten years, no suggestion even of its function had been made, save the infantile one embodied in the absurd name it bears—that it secreted the nasal mucus, although its sister enlargement higher up in the same tract, the pineal gland, had been thought worthy by Descartes to be selected as the anatomical home of the soul.

As a rule, the true pioneer of medical progress is the clinician, and not the laboratory worker. The first ray of light in this region came from pathology, and not from anatomy or biology. When Souza-Leite announced in 1890 that the pituitary body was markedly enlarged in most cases of the disease described and named by Pierre Marie and himself several years before as acromegaly, he first gave a standing to the question at the head of this article. Hitherto the gland had been almost unanimously regarded as a purely vestigial structure of most interesting and puzzling origin and history, but of no present value whatever to the organism.

For some time after this report, even the majority of pathologists seemed inclined to regard its enlargement as a mere coincidence, or, at most, one of the symptoms of the disease, but when, in 1892, Tamburrini, Brissaud, and Taruffi almost simultaneously reported a similar condition in certain cases of gigantism, this position was no longer tenable. And when it was further shown on the one hand by microscopic examination that the enlargement was a true hypertrophy of the gland substance, and not a mere interstitial or adventitious outgrowth; and, on the other, that in at least three cases marked involvement of the body by neoplasms produced no acromegalic symptoms whatever; and, finally, in 1895, that extirpation of the pituitary in young kittens and puppies was promptly followed by muscular weak-

ness, falling temperature, marasmus, and death; the possibility that the gland still exerted an active influence upon the metabolism of the body was raised to the rank of a high probability. As to the nature of this influence, we are almost completely in the dark, except that it appears to be exerted through the medium of an "internal secretion," like that of the thyroid, which acts chiefly upon the trophic fibers of the peripheral nervous system. The attention of neurologists in particular and of clinicians in general having been fairly aroused, new facts bearing upon the problem began to be contributed from every hand. Cases of fatal acromegaly in giants were reported by Virchow, Dana, the writer, and others. At the same time the skeletons of giants preserved in museums were investigated, that of the celebrated "Irish Giant," Cornelius McGrath, was shown in a masterly and elaborate monograph by Cunningham to present unmistakable traces of acromegaly, including a huge pituitary fossa, while a similar condition was reported from Reggio by Taruffi in the skeleton of a giant who had died in 1808. The records of giants for two hundred years back have been carefully examined, and a number of living ones have been studied, with the result that it is safe to say that from forty to sixty per cent. of these huge creatures are undoubted cases of acromegaly. While from the fact that, out of over one hundred cases on record, only one lived to old age, very few to middle life, and a majority died before the age of thirty, and that many deaths were due to a general failure of the vital powers or some trivial intercurrent disease imposed upon this, it is reasonable to conclude that eighty per cent. of giants are the subjects either of acromegaly or some closely allied trophic disorder. Myth and popular impression to the contrary notwithstanding, giants are a short-lived, feeble-minded, weak-bodied race, shambling in their movements, and of the mildest of dispositions. They are occasionally possessed of great muscular power, but this seldom lasts more than a few years, just as is also seen in some cases of acromegaly. The position which appears to us best to harmonize these facts is that acromegaly and gigantism are similar, if not identical, disturbances of pituitary metabolism, the one beginning in early life before the full stature has been reached, and producing comparatively symmetrical results extending over a considerable period, the other developing after maturity and expending its "overgrowth" force at the points of least resistance to growth—the hands, feet, nose, and lower jaw. In both, the essential process is a more or less rapid overgrowth, reaching a definite limit and soon followed by correspondingly rapid decay. The ultimate result is the same in both, the situation of the outgrowth (extremities and distal portions of appendicular skeleton generally) is strikingly similar; there is the same disturbance of the sexual functions, in fact, almost the only differences between them are in the pressure-symptoms (headache, hemianopia) and more rapid course of the adult form.

WOODS HUTCHINSON, M.D.

ECHOES AND NEWS.

An Appropriation for Examining Surgeons.—The present House of Representatives has passed the pension appropriation bill, which includes the handsome sum of $700,000 for the fees of examining surgeons during the fiscal year.

Statistics of Suicides.—M. Pawloski states that Europe furnishes 25,000 suicides annually. Last year there were 8226 in France alone. The largest percentage of deaths from this cause occurs between the ages of fifty and sixty years.

Mount Vernon Hospital Reopened.—A number of physicians in Mount Vernon, N. Y., have practically decided to reopen the local hospital, which had been closed from lack of funds. January 1st is spoken of as the date for beginning the work anew. Patients without means are to be treated free of charge.

Substantial Sympathy.—The sympathy felt for Dr. Cullingworth by the profession has been shown in a very practical manner. A fund to assist him in defraying the heavy expenses of his recent trial has been established, and the prompt contributions are strong evidences of the interest taken in his vindication. Within the first forty-eight hours over £500 were subscribed.

Death of Dr. Déclat.—In the death of Dr. Déclat, France has lost one of her most distinguished surgeons. He was the author of several treatises on antiseptic methods of treatment, and his name is closely associated with the advocacy of carbolic acid in surgery. After a long and successful professional career in Paris Dr. Déclat retired to Nice, where his death recently occurred.

Increased Salaries.—The Lunacy Commissioners of New York, in accordance with the provisions of the last Legislature, have experienced the pleasant sensation of having their salaries advanced between thirty and forty per cent. In future their entire time will be occupied with the duties pertaining to their offices. Civil-service

methods will hereafter be employed by them in certain departments under their control.

The Question of Medical Bulletins.—The *Medical Press and Circular* commends with highest praise the course pursued by Mr. Herbert Allingham and Dr. Scott in withholding information from reporters of the lay press, regarding the operation recently performed upon Dr. Jameson, when urgent means were used to induce them to comply with this feature of modern journalism. A number of days elapsed before it was generally known who had performed the operation, so carefully did these gentlemen guard their secret. This example of true professional modesty is recommended with special emphasis to the attention of the American profession, among whom a lamentable tendency to use the demands of public curiosity as an excuse for advertising themselves upon unnecessary bulletin boards is frequently observed.

Obituary.—Dr. Leonard J. Sanford, one of the most eminent physicians of Connecticut and a professor in the medical department of Yale University, died at New Haven, December 1st. He had been seriously ill for about two weeks with heart trouble, which perplexed the attending physicians and the patient himself, who watched with professional interest his symptoms and his condition from time to time. Dr. Sanford was born in New Haven on November 8, 1833. He obtained his education largely in his native city, but was graduated from the Jefferson Medical College at Philadelphia in March, 1854. He received the honorary degree of M.A. from Yale in July, 1858, and was appointed professor of anatomy and physiology at Yale in May, 1863. Since that time he had given an annual course of lectures on these subjects, and also upon the subject of hygiene in the medical and other departments of the university. Since 1855 he had been a practising physician in New Haven.

The New Operating Building at the Boston City Hospital.—The new surgical operating building of the Boston City Hospital is finished, and the surgical operating service has been transferred from the old building to the new. The first operation was performed here Thanksgiving Day by Dr. David W. Cheever, senior visiting surgeon, in the presence of the surgical, visiting, and house staffs. While giving some reminiscences in connection with the hospital which were of interest to those who are now or have been connected with it, Dr. Cheever remarked: "Anesthesia, clinical instruction, and asepsis would seem to mark the three epochs of our hospital, and I often wonder, inasmuch as thirty years have brought to pass all these improvements, what surgery will be thirty years hence. It seems to me it has reached its largest limit of operations, and that operations henceforward will probably decrease, because I think that the progress of bacteriology will enable us to prevent a good many diseases, and will anticipate the surgeon by curing cases before they reach his hands."—*Boston Med. and Surg. Journ.*

Bacterial Diagnostic Work in London will Retrograde.—On January 1, 1897, the laboratory work for diagnostic purposes in diphtheria of the London Asylums Board will be discontinued. Whatever examinations of that kind that may thereafter be made will be conducted by the medical men of the several hospitals. The laboratory of the Royal Colleges, that has been the scene of the good work of the past two years for the benefit of the public, will be abandoned by the Board, and the services of Dr. Sims Woodhead will cease in the direction of diphtherial work. The *Lancet* opines that the Board, in taking this backward step, has not been actuated by any preëminent desire for the welfare of the community, and expresses disappointment that the work done in 1896 cannot be extended and amplified to something like the scale upon which the like work is carried on in the United States and in certain parts of the Continent. It further hints that there has been some clashing of interests between the Board and the Royal Colleges, which might better have been placated or overborne on behalf of the suffering general public.

The Tallerman-Sheffield Hot-air Apparatus.—An opportunity was afforded the members of the medical profession to witness the first public demonstration of the Tallerman-Sheffield Patent Localized Hot-air Apparatus at the Hospital for Ruptured and Crippled, New York, December 7th. A number of prominent general practitioners and specialists were present, and after a short introductory by Dr. Gibney, in which he referred to the several cases experimented on in the hospital during the preceding week, the inventor, an Englishman, Mr. Tallerman—a retired merchant (?)—endeavored to describe, in a manner not eminently scientific, the mechanism of the apparatus. Two patients, an acute knee-joint case and a case of chronic sciatica, were put in the machines and kept there for a period of forty to fifty minutes at a temperature of 220° to 240° F. The body temperature was but slightly raised, and very little was really accomplished by the treatment, though much has been claimed for it as a pain-relieving agent. Dr. Gibney, however, showed some children who had been slightly benefited by the repeated "sittings," and while the apparatus bears an English name it is practically an old method—dry heat followed by gentle massage locally—which many doctors have employed for years. On the whole the demonstration was rather disappointing, but some fair results are claimed for it in England in cases of acute rheumatism, lumbago, and neuralgia.

The League Island Navy Yard.—The exposure made by the NEWS, after a careful investigation of the quarters provided for the men at the League Island Navy Yard has been instrumental in calling the attention of the officials to the cause of the unhygienic and insanitary surroundings which exist there. The recent annual report of the post-surgeon, Dr. Wm. H. Rush, to the Navy Department affirms the worst statements made by the NEWS regarding these conditions, and confirms the assurance that the source of disease and contagion could not be ascribed to the Philadelphia water. He says: "There is no sufficient water-supply at this yard. At present, for drinking and cooking purposes, rainwater is used, and in seasons of little rain great economy is required in its use.

For flushing and other cleaning purposes, Delaware River water is supplied. The latter is daily pumped into a large tank in the attics of the houses. The tanks are wooden, unlined, and leak at the joints, and are intentionally overflowed in order to fill an iron tank alongside of the houses used for outdoor purposes, so that in the large leaden troughs under the tanks there is more or less water evaporated, augmenting that from the exposed surface of the tanks. Two cases of sickness have originated in one of the houses, which I attribute to this source. One case developed into typhoid fever. Inquiry and rumor have shown the existence of diarrheal affections among the workmen employed on the pumps along the river front, who are compelled to use the rainwater for all purposes. Cases of typhoid fever have developed among them."

SPECIAL ARTICLE.

THE QUALITY OF ANTITOXIN USED IN AMERICA.

AN INVESTIGATION BY THE MEDICAL NEWS, EMBRACING THE RESULTS OF CAREFUL TESTS APPLIED TO THE SAMPLES OF THE LEADING MANUFACTURERS, INCLUDING MUNICIPALITIES AND PRIVATE ENTERPRISES.

THE most important contribution that has been made to the subject of serum-therapeutics, especially in its application to diphtheria, was the Report[1] of the Collective Investigation Committee of the American Pediatric Society, which appeared last summer. This report was awaited with unusual interest, and proved a great surprise to the friends, as well as to the opponents, of serum-therapy. One of the most striking features developed by the investigation was the widespread employment of the antitoxin, and the number of physicians who were using it. The general inference to be drawn from the report, as a whole, was that the antitoxin treatment of diphtheria had proved so efficient that there was no longer any doubt of its permanency as a therapeutic measure; and yet every one who carefully analyzed its details was possessed of the conviction that it bore two pronounced elements of uncertainty. The first had reference to the amount of the dose, and the second, which is still more important, was a doubt as to the quality of the serum. When over six hundred physicians in private practice are making use of a therapeutic agent, the quality of that agent is of the supremest importance.

It therefore occurred to the MEDICAL NEWS that an investigation into the quality of the various serums most extensively used in the large cities of the country, would be a fitting supplement to the Collective Investigation Report, and would render to the cause of serum-therapy, to the army of physicians who were making use of this agent, and, indeed, to humanity at large the greatest possible service.

[1] See MEDICAL NEWS, July 4th, 1896.

METHODS OF SECURING SAMPLES.

In order that the investigation might be conducted with absolute impartiality, samples of antitoxin were procured in the open markets in accordance with the method adopted by any physician intending to use the remedy in his private practice. These samples were supplied by doctors residing in different localities, with the understanding that each should procure the brand of serum most extensively used in his respective city. Nineteen specimens were thus obtained; six of these were the output of two municipal laboratories, *i.e.*, they were board-of-health serums of New York and Philadelphia. The products in each case bore duplicate labels, except as to the dates of manufacture. Thirteen came from private manufacturers in this country and abroad, representing the following firms: Institute Pasteur de Lille, Schering, Parke, Davis & Co., Institute Pasteur of Paris, H. K. Mulford Co., Buffalo Antitoxic Co., Roux Institute Pasteur of Paris, Behring, and the New York Pasteur Institute (Gibier). These were procured from the following cities: Montreal, New York, Philadelphia, New Orleans, Buffalo, and Cleveland. The serum issued by the Board of Health in Chicago is the product of the laboratory of the New York Board of Health, and, therefore, no samples from that city were examined. No serum was secured from Boston, the Massachusetts State Board of Health, when appealed to, deciding "not to submit a sample for the reason that the antitoxin is not for sale, and that all necessary questions relating to it are published in the reports of the board when ripe for it."

It is therefore evident that the work was undertaken without the possibility of favoritism or prejudice, and that the specimens were procured under conditions corresponding as closely as possible with those met by the practitioner when called upon to obtain it for immediate administration.

HOW THE SAMPLES WERE PREPARED FOR THE TEST.

The samples were sent direct to the New York office of the MEDICAL NEWS. Upon their arrival the external wrappers, and the labels on the bottles were carefully removed, pasted in a book, and numbered 1, 2, 3, etc., the corresponding figures being pasted upon the bottles, so that there remained no means of identifying them except by the number attached. These bottles were then forwarded to Professor A. C. Abbott at the Laboratory of Hygiene, University of Pennsylvania, at Philadelphia.

In obtaining the service of so distinguished a bacteriologist as Dr. Abbott, we feel that the most perfect confidence in the scientific accuracy of this report is secured.

That our readers may have a definite idea of the

procedure followed in testing these samples, we preface Dr. Abbott's report with the following explanation:

METHOD OF TESTING A SAMPLE OF ANTITOXIN OF UNKNOWN STRENGTH.

First, a guinea-pig weighing about 250 grams is injected with the amount of toxin which we know from previous experience to be probably the fatal dose. Six other guinea-pigs are then described and weighed. Into each of six separate flasks is placed ten times the amount of toxin injected into the original or control-pig. The problem is to determine how much of the preparation of antitoxic serum to be tested will protect a 250-gram pig from ten times the fatal dose of toxin. We therefore mix with the toxin in each one of these six flasks different amounts of antitoxin, beginning with No. 1, an amount of antitoxin so large that we feel sure that if any antitoxin whatever is present in the serum, it will save the life of the guinea-pig into which it shall be injected; and No. 6 receiving an amount of serum so small that we feel sure that it will probably contain an insufficient amount of antitoxin to protect the guinea-pig into which it shall be injected. The other four guinea-pigs will receive amounts of serum varying between these two limits. If now we find, for instance, that pigs which received $\frac{1}{100}$ of a c.cm. of a serum and larger quantities live, and those receiving smaller quantities die, we know that $\frac{1}{100}$ of a c.cm. was sufficient to protect the life of the guinea-pig from the fatal effects of ten times the mortal dose of toxin. That is, this serum contains ten or more units of antitoxin in each c.cm. If now the pig shall receive the next smaller dose of antitoxin ($\frac{1}{\frac{1}{100}}$ of a c.cm. of antitoxin) and die, we know from this first experiment that this antitoxin contained more than ten units and less than twenty units in each c.cm. If we wish to test the serum accurately, we would now take a new batch of five guinea-pigs, giving one a dose of toxin which a week before proved to be the fatal dose; describing and weighing again the other four pigs, we would add to each of the four flasks a quantity of toxin ten times the amount fatal to the 250-gram guinea-pig, and add to the toxin in flask No. 1, $\frac{1}{10}$ of a c.cm. of serum; to flask No. 2, $\frac{1}{12}$; to flask No. 3, $\frac{1}{14}$; to flask No. 4, $\frac{1}{16}$. If now we find that the guinea-pig receiving $\frac{1}{14}$ of a c.cm. of serum lives, and the pig receiving $\frac{1}{16}$ dies, we know that this serum contains between fourteen and sixteen units in each c.cm. This would be as accurately measured as would ever be necessary. In both these experiments it is understood that the control-pig, that is, the pig receiving the supposed fatal dose of toxin, died from the toxin within three weeks of the date of the injection.

BACTERIOLOGICAL REPORT[1] OF A. C. ABBOTT, M.D. (PROFESSOR OF HYGIENE IN THE UNIVERSITY OF PENNSYLVANIA), AND O. P. PHILLIPS, PH.M. (THOMAS SCOTT FELLOW OF HYGIENE, UNIVERSITY OF PENNSYLVANIA).

DURING the early autumn of the present year we received a communication from the Editor of the MEDICAL NEWS calling attention to the discrepancy that is observed in the results of the therapeutic use of diphtheria antitoxin in this country, and suggesting the possibility of this being due to lack of uniformity in the strengths of the various preparations for sale by American dealers. He requested us to undertake the testing of samples of serums from the different makers from whom our supplies are obtained. This we consented to do on the conditions that the samples be obtained by him, or by an agent, in the open market, without the dealers' knowledge of the use to which they were to be put; that the labels be removed, the bottles be designated by a number, and shipped to this laboratory, a careful record being kept by the Editor of the NEWS as to the identity of the numbered bottles. This precaution we thought wise, in order to eliminate any prejudices on our part in favor of, or opposed to, serums from particular sources.

The results of our investigations, that are here presented in tabulated form, refer to the serums by number, in the order that they came into our hands. We are not aware of their source in a single instance. The interpretation of the numbers by which we designate the serums will be appended to this article by the Editor of the MEDICAL NEWS, for whom these tests were made.

The method employed in determining the antitoxic values of the several samples is that of Ehrlich, Kossel, and Wassermann, and the protective values of the serums are expressed in terms corresponding to their standard, *viz.*, a serum of such strength that one-tenth c.cm. fully protects a guinea-pig against ten times the minimum fatal dose of diphtheria toxin is a "normal serum," and one cubic centimeter of such a serum contains an "immunizing unit." Serums of such strength, therefore, that 0.01 and 0.001 c.cm., have the same effect as 0.1 c.cm. of a normal serum, are ten and one hundred times as strong as a normal serum, *i.e.*, contain ten and one hundred immunizing units respectively per c.c.m.

On this basis, nineteen different samples have been tested by us, with the results given in Table I.

From a perusal of this table, it will be seen that the majority of the samples exhibit the average required strength; that several, *viz.*, Nos. 1, 2, 7, 14, were unusually rich in protective substances, while

[1] From the Laboratory of Hygiene, University of Pennsylvania.

in only a very few samples, Nos. 9, 11, 15, was there a relative deficiency of antitoxic properties.

In one or two instances the figures given for the value of a sample do not, in all probability, represent the *highest* limit of protection possessed by these

TABLE I.

Serum number.	Times tested.	Immunizing units per c.cm.	No. of c.cm. of serum in original flask.	Total No. of immunizing units each flask.
1.....	12	350	10	3500.
2.....	14	350	9.9	3465.
3.....	6	150	11.2	1680.
4.....	10	250[1]	2.8	700.[1]
5.....	6	70	9.25	647.5
6.....	6	150	9.2	1380.
7.....	14	350	18.4	6440.
8.....	6	150	4.2	630.
9.....	7	50	3.55	177.5
10.....	5	100	9.7	970.
11.....	7	Less than 20	3.6	Less than 72
12.....	4	100	9.7	970.
13.....	7	100	3.45	345.
14.....	13	350	9.1	3185.
15.....	8	Less than 50	8.2	Less than 410
16.....	8	70	9.	630.
17.....	4	100	9.7	970.
18.....	4	100	9.1	910.
19.....	10	200	9.3	1860.

serums; this refers only to those samples that proved to be of unusual strength. On the other hand, the samples shown to be so poor in antitoxin as to represent but a very low multiple of a normal serum, were eliminated after tests that to us demonstrated their comparative uselessness for therapeutic purposes. The figures given for the balance are those at which protection was absolute.

This closes Dr. Abbott's report.

In order that a comparison may be made between the actual strength of the various samples as shown above and the advertised strength as indicated on the labels, we append Table II.

TABLE II.

Serum Number.	Immunizing Units per c.cm. Claimed.	Number of c.cm. of Serum in Original Flask. Claimed.	Total Number of Immunizing Units in each Flask. Claimed.
1....	50	Not stated.	Not stated.
2....	150	10	1500
3....	Not stated.	Not stated.	1500
4....	Not stated.	Not stated.	1500
5....	100	10	1000
6....	100	10	1000
7....	"Dose 5 to 30 c.cm."	20	Not stated.
8....	"Dose 5 to 20 c.cm."	5	Not stated.
9....	Not stated.	Not stated.	1000
10....	Not stated.	10	Not stated.
11....	Not stated.	Not stated.	1000
12....	Not stated.	10	Not stated.
13....	100	5	500
14....	Not stated.	Not stated.	600
15....	Not stated.	Not stated.	1500
16....	20 "estimated."	10	200
17....	100	10	1000
18....	100+	10	1000+
19....	100	10	1000

[1] The serum in flask No. 4 was exhausted before this test could be carried higher.

A comparison of this table with the preceding one shows a very great discrepancy in some instances in the actual strength of the sample and its advertised strength. Not only that, but samples from the same manufacturer purchased in different markets at the same and different dates show a wide variation. For instance, samples Nos. 1 and 4 both came from one laboratory and were procured at the same time; samples Nos. 5 and 6 came from one laboratory at one time and bore the same date; samples Nos. 9, 11 and 14 all came from one laboratory. Nos. 9 and 11 were purchased in New Orleans and No. 14 in Cleveland. Nos. 13 and 19 came from one laboratory also.

CAUSES OF VARIATION AFTER SERUM HAS BEEN TESTED AND BOTTLED.

Practically it may be said that some samples of serum are found to retain their strength absolutely for periods of from three to twelve months. Other samples are found to gradually lose their strength, so that at the end of three or six months they may contain but about two-thirds of the original strength, or two-thirds the amount of antitoxin units. This does not seem to depend entirely upon the preservative used. The ordinary preservatives are camphor, carbolic acid, and tricresol. Variations have occurred with all of these three substances.

The value of the antitoxin unit is estimated entirely upon the reaction of guinea-pigs. These animals though fairly uniform do vary within considerable limits. It is, therefore, possible that in a series of tests the variation in the susceptibility of different batches of guinea-pigs may be great enough to make quite a variation in the standard; that is, for example, one guinea-pig may require one-tenth more than another guinea-pig for a fatal dose. If the stronger guinea-pig be used as a test the antitoxin sample tested would contain one-tenth less number of antitoxin units than the same sample tested on the other guinea-pig, which was weaker and required one-tenth smaller amount of toxin to kill it.

Different manufacturers vary in their ideas of the proper number of units to place in the different grades. Recognizing the fact that serums may gradually lose in strength under various conditions, and believing that a larger number of antitoxin units is absolutely harmless, some manufacturers insert even as many as twice the number of units which they represent to be present upon their labels. Others believe it more accurate to put in only about so many more units as they expect the serum to deteriorate within the time during which they expect it to be used.

Another cause of variation in the strength of the different preparations of antitoxins is that the various preservatives used cause a marked deterioration in the antitoxins. It is necessary, therefore, to always test the antitoxins after the addition of the preservative in order to know the number of units present in a completed and bottled preparation.

It is apparent that the difficulties to be surmounted before serum antitoxin can claim a place among the established reliable therapeutic agents are still very great. But when an exact system of dosage shall have been established, and when serum of a uniform standard strength shall always be at hand, the great obstacles in the way of its complete acceptance will be eliminated.

THE USE OF ANTITOXIC SERUM IN THE TREATMENT OF DIPHTHERIA UNDER THE SUPERVISION OF THE NEW YORK CITY HEALTH DEPARTMENT, WITH A RESUME OF THE PUBLISHED REPORTS ON THIS SUBJECT.

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PATHOLOGIST AND DIRECTOR OF THE BACTERIOLOGICAL LABORATORIES, NEW YORK HEALTH DEPARTMENT,
AND
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(Continued from page 683.)

WITH a view to a more complete study of the fatal cases of diphtheria occurring in New York during the last few months, a letter has been addressed to every physician who reported a death from diphtheria or croup, asking for information as to whether antitoxin was employed in the case, and if so, on what day of the disease it was administered, and what was the condition of the patient at the time of administration. Personal observations on the subject were also requested.

Information has been received, between May 7 and November 1, 1896, from 306 physicians, with regard to 336 fatal cases of diphtheria reported to the Board of Health—124, or thirty-seven per cent. of these, were reported as treated with antitoxin, and 212, or sixty-three per cent., were reported as treated without antitoxin. The total number of deaths from diphtheria and croup reported during this period was 658. There were, therefore, 322 deaths with regard to which no information was received in response to the letter of inquiry.

Of the 124 fatal cases treated with antitoxin, 41, or thirty-three per cent., were reported as moribund or hopeless at the time of injection, or as dying within twenty-four hours after the first injection, and hence the antitoxin could not have been expected to have any effect; 33 cases, or twenty-six per cent., were injected on the fifth day of the disease, or later, when the remedy has relatively little value; 29 cases, or twenty-three per cent., were complicated with sepsis, scarlet fever, measles, bronchopneumonia—notably bad cases; and 13 cases, or ten and one-half per cent., died from cardiac paralysis, sudden death "resulting from getting up too soon, contrary to instructions."

Of the 212 fatal cases where no antitoxin was used, 50, or twenty-four per cent., were moribund or hopeless when first seen, and hence no antitoxin was used, as stated by the attending physician, because of the patient's condition; 33 cases, or sixteen per cent., were seen too late, in the opinion of the attending physician, for antitoxin to be of any use; 17 cases refused treatment with antitoxin, though strongly advised; and 4 cases were not injected, because being complicated with scarlet fever, measles, etc., antitoxin was considered useless. In 94 cases, or forty-four per cent., antitoxin was not administered, because the attending physician was opposed to its use, was doubtful of its efficacy, or no reason was given. A number of physicians stated that in future they intended to use antitoxin owing to the bad results obtained by other methods. A very large majority of the physicians from whom reports were received (over two-thirds), expressed themselves as strongly in favor of the use of antitoxin in diphtheria. Many of them presented records of previous severe cases treated with antitoxin with good results.

A report is also presented which was prepared by Alfred L. Beebe, Ph.B., Assistant Director of the Diagnosis Bacteriological Laboratory. This includes a series of tables and charts, showing the actual and relative mortality from diphtheria and croup in New York, Berlin, and Paris, previous to and following the introduction of antitoxin in these cities. Mr. Beebe's report follows: "In accordance with your directions the following tables and charts have been prepared from the official statistics of New York, Paris, and Berlin, with a view to show the effect, if any, produced by the use of diphtheria antitoxin on the actual and relative mortality from diphtheria and croup in these cities.

Table 8 gives the annual actual mortality in New York from diphtheria and croup for the years 1880–1895, the case fatality from diphtheria, 1880–1890, and the case fatality from diphtheria and croup combined, 1891–1895, and from January to October, 1896. Croup was not officially classed as a contagious disease by the New York Health Department prior to 1891, and cases of this disease were therefore not required to be reported to the Department. It will be noticed that in the first two years after the reporting of croup is required, the mortality from diphtheria is raised nearly 10 per cent. by the croup deaths (27.9 per cent. to 36.7 per cent., and 30.9 per cent. to 40.6 per cent.). After this the influence of the croup deaths becomes less, as in 1893 the Health Department declared that membranous croup was in the vast majority of cases laryngeal diphtheria, and would be so regarded by the Department. After this announcement the relative proportion of deaths ascribed to croup gradually diminishes, until in 1895 the croup deaths equaled only about one-fifth of the diphtheria deaths, while in 1891, and before, they equaled from two-fifths to one-half or more the number of diphtheria deaths. In no single year until

TABLE VIII.—NEW YORK—DIPHTHERIA AND CROUP: CASES AND DEATHS, WITH CASE FATALITY, 1880, TO OCTOBER, 1896, INCLUSIVE.

Year.	Cases.			Deaths.			Case Fatality.	
	Diphtheria.	Croup.	Total.	Diphtheria.	Croup.	Total.	Diphtheria.	Diphtheria and Croup.
1880	3307	....	....	1390	910	2300	42.3	....
1881	5196	....	....	2249	1038	3287	43.3	....
1882	3507	....	....	1525	729	2254	43.5	....
1883	2096	....	....	1009	644	1653	48.1	....
1884	2223	....	....	1090	748	1838	49.0	....
1885	2920	....	....	1325	855	2180	45.4	....
1886	3737	....	....	1727	968	2695	46.2	....
1887	5923	....	....	2167	889	3056	36.6	....
1888	6491	....	....	1914	639	2553	29.5	....
1889	6489	....	....	1686	605	2291	25.9	....
1890	4350	....	....	1262	521	1783	29.0	....
1891	4874	490	5364	1361	609	1970	27.9	36.7
1892	4654	530	5184	1436	670	2106	30.9	40.6
1893	6468	553	7021	1970	588	2558	30.4	36.4
1894	9155	486	9641	2359	511	2870	25.8	29.7
1895	9925	428	10,353	1634	342	1976	16.4	19.1
1896[1]	8046	240	8286	1224	168	1392	15.2	16.8

[1] First, second, and third quarters.

TABLE IX.—PARIS: DEATHS FROM DIPHTHERIA AND CROUP, BY MONTHS, 1889, TO JULY, 1896.

Month.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
January	214	136	184	120	164	145	48	53
February	185	182	202	135	108	110	47	61
March	219	211	192	162	149	148	45	59
April	174	196	183	131	136	133	36	69
May	184	169	145	153	133	122	38	56
June	148	144	103	124	115	80	14	31[2]
July	128	147	95	108	83	78	25	..
August	125	131	78	115	80	64	23	..
September	135	114	64	99	63	31[1]	20	..
October	116	125	73	106	58	27	33[2]	..
November	125	134	97	134	68	33	36	..
December	137	170	115	170	109	38	73	..
Totals	1890	1859	1531	1557	1266	1009	440	..

	Antitoxin not used.	Antitoxin in general use.
Largest number of deaths for any month	219	73
Smallest number of deaths for any month	58	14

[1] Antitoxin in general use.

[2] Monthly report missing; estimated from the weekly returns.

TABLE X.—BERLIN: DEATHS FROM DIPHTHERIA AND CROUP, BY MONTHS, 1889 TO JULY, 1896.

Month.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
January	119	154	102	119	165	138	79[1]	72
February	109	108	103	103	145	137	64	55
March	98	134	86	113	115	140	88	46
April	94	107	73	94	120	133	68	49
May	75	126	73	93	106	134	56	45
June	82	119	67	81	101	90	74	27
July	70	90	49	88	116	71	77	..
August	91	106	64	90	92	92	57	..
September	113	146	96	100	162	134	88	..
October	119	137	112	140	174	119	120	..
November	131	101	127	182	182	118	115	..
December	183	136	126	193	163	118	110	..
Totals	1284	1584	1078	1406	1643	1430	996	294[2]

[1] Antitoxin largely used.

[2] Mortality for first half of 1896.

1895 did the number of cases of croup reported equal the number of deaths. Owing to the rapidly fatal termination of the majority of cases of croup, the report of death was either the first report received by the Department, or the report of the case and of the death arrived almost simultaneously."

Bearing the above in mind, it is evident that the figures for case fatality from diphtheria, 1880–1890, are not comparable with those showing the combined fatality from diphtheria and croup, 1891–1895. The figures for case fatality from diphtheria alone are relatively lower from 1891–1895 than before, as is shown by the table, and as the figures for case fatality from diphtheria and croup combined undoubtedly show the true mortality in diphtheria, they are absolutely, as well as relatively, too low for these years. On the other hand, progressing backward in the scale of years, an increasing percentage of cases of diphtheria were not reported, and the case fatalities for these years are therefore higher than the truth, especially in the earlier years for which figures are given. Taking all the facts into consideration, it seems probable that for the earliest years for which figures are given, the case fatalities for diphtheria alone are somewhat too high; that for the years immediately preceding 1891 they are too low; while for the immediate years they are more nearly correct.

(To be continued.)

REVIEWS.

A TREATISE ON SURGERY. By American Authors. Edited by ROSWELL PARK, M.D., Professor of Surgery and Clinical Surgery, Medical Department, University of Buffalo, Buffalo, N. Y. In two very handsome octavo volumes, comprising about 1600 pages, with about 800 engravings, largely original, and about 40 full-page plates in colors and monochrome. Volume I, General Surgery and Surgical Pathology. Volume II, Special Surgery. Lea Brothers & Co., Philadelphia and New York, 1896.

A critical review of the first volume of this treatise will convince the reader that it will at once assume a position as one of our best surgical text-books. The work, as a whole, will compare favorably with any other, and in many respects this volume is superior to the first volume of other surgical treatises. This is especially true in regard to the chapters written by the editor, who contributes three hundred pages. The other chapters are written by teachers of note and, as a rule, they are clear, comprehensive, and concise. The volume does not contain a chapter which is not thoroughly up to date. The editor has shown his wisdom in stamping each chapter with the author's name.

In the preface he says: "The importance of bacteriology is everywhere recognized, and its teachings are impressed upon almost every page." This is true of the volume as a whole, and especially so of Dr. Park's contributions; indeed, in this respect, his treatise is decidedly in advance of any other surgical text-book. At the same time, the work is eminently practical, and credit must be given to the editor and other contributors for the logical application of scientific facts to routine practice. Such a clear adaptation of pathology to practical work will be of great use to the busy practitioner, and it will enhance the student's interest in a branch of surgery which at times seems to him tedious.

The volume contains several chapters on subjects which we do not expect to find in a surgical work. Their presence adds to the interest and value of the volume. One of these is on the surgical pathology of the blood. Another on autoinfection will be of especial use to the younger class of surgeons, who are apt to entirely overlook the influence of the "constitution" of the patient on the outcome of operation or surgical disease. In the chapter on acute intoxications is found an excellent description of delirium tremens, which disease certainly deserves a place in a surgical work. In another chapter is also an interesting account of immunity and predisposition to infection by the pyogenic bacteria.

The volume is divided into five parts and thirty-seven chapters. Part I treats of surgical pathology, and its five chapters are written by the editor—probably the most valuable part of the volume. Of especial interest is his statement regarding the diagnostic value of leucocytosis. The chapter on inflammation is admirable. The description of chemotaxis and the formation of pus is especially clear. His story of inflammation and suppuration may be, as he says, rather romantic, but it will certainly impress the mind of the student. However, his classification of the causes of gangrene must be regarded in a large degree as arbitrary.

Part II treats of Surgical Diseases. The advice as to preparation of patients for operation is, on the whole, judicious, though it will be apt to influence students to rely too much on drugs, instead of the *vis medicatrix naturæ*. His description of the difference between sapremia and septicemia is clear and good, though his definition of the former term is not elegant. In the treatment of poisoned wounds details are somewhat lacking. He gives a good account of erysipelas, but under treatment fails to mention the methods of limiting the disease by crisscross-incisions or by antiseptic injections around the erysipelatous area.

In the chapter devoted to the consideration of tuberculosis, such terms as *psophylactic*, *archepyon*, *pyoid*, and *puruloid* are noted. These terms, suggested by Dr. Park a year or two since, have failed to obtain the sanction of the profession, probably through no fault of the words themselves. The propriety of applying the term gummata to any but syphilitic masses is very questionable. In his opinion "tuberculin (Koch's) is a remedy of great value when judiciously used in selected cases."

Chapter X, by J. A. Fordyce, on syphilis, is well written, and will be a safe guide for the student and an excellent *resumé* for the busy practitioner. There are several excellent colored plates. The chapter on gonorrhea, by N. T. Belfield, gives a fair presentation of the subject. He says too little, however, about the destructive effects of the disease in the female.

The chapter on shock and collapse is concise, but it seems out of place between sections on gonorrhea and scurvy.

Part III treats of Surgical Principles and Methods and Minor Procedures. The first two chapters are written by J. Parmenter. They are satisfactory. A needed warning against the use of styptics is omitted, and surgeons will hardly agree that the "granny-knot is thoroughly secure."

In the chapter on anesthesia, by H. A. Hare, the indications for the use of the different anesthetics are clearly and judiciously set forth. In the treatment of ether-vomiting, too little stress is laid on the importance of letting the stomach alone and avoiding drugs. The method of inversion described as Dr. Kelly's antedates Dr. Kelly's birth.

Part IV, on Injury and Repair, begins with a chapter on wounds, by C. B. Nancrede, and is followed by one on gunshot-wounds, by the same author, which is most interesting. It is very full and explicit and is illustrated by many excellent cuts.

Part V treats of Surgical Affections of the Tissues and Tissue-systems. The chapter on cysts and tumors, by Dr. Park, is one of the best. Space will not allow of more than mere mention of several excellent chapters in this part, such as those on malformations, ruptures, and tendons, etc., by H. L. Burrett; on injuries and diseases of the lymphatic vessels, by F. H. Gerrish; on the veins, by J. M. Holloway; on the arteries, by Duncan Coe, and skin-diseases, by W. A. Hardaway.

The chapter on injuries and diseases of the joints is an admirable one. The short section on general considerations teems with valuable facts expressed in a clear and concise manner; indeed, this is true of the entire chapter. H. H. Mudd considers fractures and dislocations in two excellent chapters.

An index of twenty-two pages is adequate and not too elaborate. The whole volume is singularly free from errors. The proof-reading has been most careful. In such a large work there must, of course, be a few oversights, as the sentence beginning the paragraph on page 27; but the reviewer, after careful perusal of the work, has been able to discover only one or two others. This volume will certainly meet with success. Both for the student and practitioner it will be a most valuable work. It is thoroughly practical and yet thoroughly scientific. The paper, type, and illustrations are good, and the volume presents a handsome appearance.

A PRACTICAL TREATISE ON MEDICAL DIAGNOSIS. For the Use of Students and Practitioners. By JOHN H. MUSSER, M.D., Assistant Professor of Clinical Medicine, University of Pennsylvania, Philadelphia. New (2d) edition; thoroughly revised. In one octavo volume of 925 pages, with 177 engravings and 11 full-page colored plates. Cloth, $5.00; leather, $6.00. Lea Brothers & Co., Publishers, Philadelphia and New York. 1896.

THE exhaustion of the first edition of a work of this character and scope within eighteen months of its publication is unusual and complimentary alike to the author and to the medical profession.

In the preparation of this volume the writer has set up for himself the very highest ideals. It would be well if all students and many practitioners of medicine would learn this sentence from the preface: "Partial knowledge of the nature of a case differs merely in degree from ignorance, and treatment based on either invites chances unjust alike to the patient and to the interest of the physician." It is in the spirit of this declaration that every chapter has been written, and it is with the same question as to thoroughness and completeness that the author has taken advantage of the exhaustion of the first edition to revise the entire work. By so doing, every real advance that has been made in this rapidly progressing department of medicine is here recorded, and made available in a single volume. This is especially noticeable when one compares the two editions, topic by topic, or even page by page. There is no half knowledge. There is no looseness in the use of words. The author's style is clear and pointed, and yet smooth. His descriptions of the diagnostic manifestations of diseases are accurate, and not overburdened with words. The methods of conducting the physical examinations of the various organs of the body are admirably inculcated, and the results to be looked for are described in terms that are precise and yet easily comprehensible. The points of differentiation in diseases, presenting more or less similarity, are clean cut.

There is such fulness and so much detail in the author's chapters on the chemic, microscopic, and bacteriologic examinations of the pathologic products in diseased conditions, that the book can be used as a working laboratory text-book on these subjects.

The arrangement of subjects is convenient. The first six chapters, covering 191 pages, are devoted to general diagnosis, and comprise the following subjects: General Observations, The Data Obtained by Inquiry, The Data Obtained by Observation, Bacteriological Diagnosis, The Examination of Exudations, Transudations and Cystic Fluids, and The Morbid Processes and Their Symptomatology. The remainder of the book, a total of 718 pages, is given to Special Diagnosis, in which the organs are taken up seriatim, and the manifestations of each disease are thoroughly discussed. There are comparatively few cross-references, and a competent index makes easy work of looking up any subject in its entirety. This is a great advantage to the student, for this grouping together, by his own efforts, of the symptoms of a given disease, the descriptions of which are to be found under different heads, is sometimes difficult and always annoying.

The illustrations are sufficiently numerous, perhaps, although they might have been used to advantage in some instances where not employed. The engravings illustrate, however, and do not serve simply to embellish. The number of colored plates in this edition is increased from two to eleven, and they are admirable samples of artistic work.

It is certain that the revised edition of this work will meet all the requirements of student and physician, and that it will long hold its place as one of the most notable contributions to scientific medicine.